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I.—SOME PACIFIC COAST ECTOCARPACEÆ.

Family ECTOCARPACEÆ *C. Ag.*

Ectocarpaceæ C. AG., Syst. Alg., XXX, 1824. Emend. Thur. Le Jol. List. Alg. Mar. Cherb., 1863.

Plant body arising from a mass of creeping filaments or a disk-like mass of cells mostly monosiphonous, more or less branched; reproductive bodies of two kinds—plurilocular sporangia formed of numerous small, densely aggregated, linear, lanceolate, or ovoid cells; unilocular sporangia cuboidal or globose.

SYNOPSIS OF GENERA.

The basal part of the plant consisting of branching filaments.
    The plurilocular sporangia intercalary with the cells of the vegetative filaments.. *Pylaiella.*
    The plurilocular sporangia not intercalary.
        Basal filaments mostly superficial .... *Ectocarpus.*
        Basal filaments ramifying through the tissue of the infested plant *Streblonema.*
The basal part of the plant consisting of a cellular, disk-like mass.
    No paraphyses...*Phycocelis.*

1. Phycocelis *Strœmf.*

Phycocelis STRŒMF., Not., III, 1888, 383.

Plant small epiphytic, the basal part consisting of one or two layers, more or less circular in outline, increasing by peripheral growth. Erect filaments present; unilocular sporangia and paraphyses unknown; plurilocular sporangia sessile or stout; zoosporal cells mostly erect in a single row.

Oct. 29, 1898.

2. **Phycocelis reptans** (*Crouan*) *Kjellm.*

PLATE XII, FIGS. 8–12.

Phycocelis reptans (CROUAN) KJELLM. Handbk. I, 1890, 81.
Ectocarpus reptans CROUAN, Fl. Finist., 161, 1867.

Plant forming rounded patches 1-5 mm. in diameter, the disk-like base of one or two-layers of cells 12-15μ broad. Erect filaments 2-4 mm. high, unbranched, ending in an abrupt, hyaline hair; cells 8-12μ broad, as long to twice as long as the diameter; chromatophores small, oval or band form; plurilocular sporangia lanceolate or linear-oblong, sometimes curved, 25-75μ (commonly 40-55μ) x 12-30μ, terminal on the erect filaments or rarely sessile on the basal ones.

On the leaves and air-bladders of *Nereocystis lutkeanus*. Pacific Grove, California.

3. **Phycocelis fœcunda** *Strœmf.*

PLATE XII, FIGS. 1–7.

Phycocelis fœcunda STRŒMF., Not., 1888, 383.

Spots orbicular, ½ mm. or so broad. Creeping filaments united to form a disk-like, unistratose, basal part; the erect filaments simple, of 2-6 cells which become transformed into sessile or stipitate, uniseriate, cylindrical, plurilocular sporangia, 27-40μ x 6-10μ; a cluster of long hairs in the center of each spot.

On *Macrocystis pyrifera*, *Desmarestia ligulata*, and *Pterygophora Californica*. Pacific Grove, California.

4. **Streblonema** *Derb. & Sol.*

Streblonema DERB. & SOL., Cast. Cat. Pl. Mars. Suppl., 1851, 100.

Plant body filamentous, consisting of two parts, the numerous branching filaments ramifying through the tissue of a host plant; erect filaments branched or sessile, usually ending in or bearing long hairs; unilocular sporangia large, subglobose; plurilocular sporangia simple or sometimes branched, one to many seriate.

5. **Streblonema fasciculatum** (*Thur.*) *Le Jol.*

PLATE XIII.

Streblonema fasciculatum THUR. in LE JOL. Alg. mar. Cherb., No. 100, Liste p. 73.

Vegetative filaments irregularly much branched, branches alternate, irregular, 6-9μ broad, cells 1-3 times as long as broad, slightly constricted at the joints; unilocular sporangia globose or ovoid, sessile or rarely stalked, 25-35μ x 21-30μ, borne on the main filament or the branches; plurilocular sporangia lanceolate or linear, obtuse at the apex, sessile or stalked, borne on the branches near the surface of the infested plant, 40-100μ x 8-12μ, often uniseriate.

In *Nemalion andersonii* Farl. San Pedro, California, Aug., 1896.

The plant is composed of an irregularly branching mass of filaments running through the soft central filaments of the *Nemalion*. Some of the branches extend out to the surface and are simple; others are once or twice dichotomously branched near the surface. The plurilocular sporangia are very irregular, born singly or sometimes aggregated on the outer sides of the branches, not at all branched. Long and colorless hairs are born on the branches with the plurilocular sporangia.

6. **Ectocarpus** *Lyngb.*

Ectocarpus Lyngb., Hydrophyt. Dan., 1819, 130.

Plant filiform, branching, attached to the substratum by branching, creeping filaments. Erect filaments monosiphonous, branched, occasionally corticated by outgrowths of superficial cells; unilocular and plurilocular sporangia terminal or lateral, never intercalary.

7. **Ectocarpus acuminatus,** sp. nov.

Plate XIV, Figs. 1–5.

Plant minute; creeping filaments forming a compact network; erect filaments simple, of the same size from base to apex, a mm. or so high; cells not at all constricted, 12–14μ broad, below as long as the diameter, above 2-3-5 times as long; chromatophores elliptical, much more abundant in the central part of the filament; plurilocular sporangia sessile on the base of the erect filaments or arising on a long or short stalk from the creeping filaments, lanceolate, very long-acuminate, sometimes tipped with a short hair, often more or less curved, 90-300μ (rarely 400μ) x 20-30μ.

Forms minute, light brown tufts in the conceptacles of *Cystoseira osmundacea*. Pacific Grove, California, July, 1896; San Pedro, California, Aug., 1896.

The creeping filaments ramify through between the paraphyses and attach themselves to the inner wall of the conceptacle; the erect filaments extend out of the mouth of the conceptacle a mm. or so; the plurilocular sporangia point toward the opening or extend just out of it.

8. **Ectocarpus ellipticus,** sp. nov.

Plate XIV, Figs. 6–9.

Plant minute, erect, tufted, attached to the inner wall of the cryptostomata or conceptacles by a colorless mass of creeping, branching filaments. Erect filaments unbranched or with a few unicellular branches, 9–12μ broad; cells at base once to twice as long as the diameter, above three times as long; chromatophores oval, numerous; plurilocular sporangia linear or linear-lanceolate, 75–100μ x 18–25μ, borne laterally at or near the base of the erect filaments or occasionally arising directly from the creeping filaments, sessile, or the lower on short stalks; zoosporal cells 5–8μ broad, one to few seriate; unilocular sporangia sessile, ovate or elliptical, 30–40μ x 12–18μ, borne on the same tufts with the plurilocular sporangia.

Forming minute, dark brown tufts 1 mm. high in the cryptostomata and conceptacles of *Fucus evanescens*. Pacific Grove, California.

9. **Ectocarpus chitonicolus,** sp. nov.

PLATE XV, FIGS. 1–4.

Plant 1–2 mm. high; creeping filaments numerous, branched, 15μ broad; cells once to twice as long as the diameter; erect filaments mostly unbranched, 14μ broad at base, somewhat narrowed above; cells below ½–2 times as long as the diameter, above 2–3 times as long, not at all constricted at the joints; chromatophores numerous, small and oval; plurilocular sporangia lanceolate or narrowly ovate, obtuse at the apex, 90–175μ x 20–35μ, borne laterally in the erect filaments or occasionally on the creeping ones; the lower sporangia on a long or short stalk, the upper sessile.

Forms minute tufts on the back of a chiton. Pacific Grove, California.

A variable species which approaches *E. cylindricus* in some of its forms but is separated from it by the more pointed, plurilocular sporangia and the uniformly smaller size of the vegetative parts.

10. **Ectocarpus cylindricus,** sp. nov.

PLATE XVI.

Creeping filaments irregularly branched, 12–20μ broad; cells 2–3 times as long as the diameter; erect filaments simple or giving off a few short branches below, of the same size throughout, 18–30μ broad; cells below and above 2–3 times as long as the diameter, in the central part as long as the diameter, not at all constricted; chromatophores numerous, disk shaped; plurilocular sporangia lateral, on a one- to several-celled stalk, erect, cylindrical or obovate, very obtuse above, 80–200μ x 35–45μ, opposite, most abundant below; unilocular sporangia on separate filaments, ovate or elliptical, 60–120μ x 30–40μ, usually on a one-celled stalk, or the upper occasionally sessile, often opposite.

The plant forms a compact, velvety mass 2–4 mm. high, of indefinite extent on the stems and rhizoids of *Egregia* *menziesii*, on the fruiting tips of *Cystoseira osmundaceæ*, on rocks, on *Codium adhærans* and *C. mucronatum Californicum*. Pacific Grove, California, 1895.

The form on *Cystoseira* averages slightly larger and many of the plurilocular sporangia arise directly from the creeping filaments; no unilocular sporangia were found on this form. In the forms that grow on a hard substratum, the creeping filaments are short and form a compact network on the surface; in those that grow on a soft substratum (*Codium*, etc.) the creeping filaments are much elongated and ramify between the loose threads of the host plant.

11. **Ectocarpus hemisphericus,** sp. nov.

PLATE XVII.

Plant densely tufted, arising from a compact network of creeping filaments. Erect filaments unbranched at base, primary branches dichotomous, divergent, long, not at all narrowed upward, ending bluntly above, secondary branches numerous, short, clustered, many of them ending in a short, blunt hair; cells at base 15–20μ broad, 2–3 times as long as the diameter, above 22–30μ broad, 1–2 times as long as the diameter, slightly constricted at the joints; chromatophores small, numerous, linear or disk-shaped; plurilocular sporangia lanceolate or ovate, obtuse, short, 30–90μ x 14–20μ (rarely 30μ long), borne laterally on a short stalk in the upper part of the filament; unilocular sporangia short, cylindrical, 30–35μ x 20–25μ, on a one-celled stalk, on the same filament with the plurilocular sporangia.

The plant is very abundant, forming dense, hemispherical tufts 2–4 mm. high on *Pelvetia fastigiata* and *Taonia lennebackeræ*. San Pedro, California, Aug., 1896.

But one specimen was found of the form on *T. lennebackeræ*.

12. **Ectocarpus hemisphericus minor,** form. nov.

PLATE XVIII, FIGS. 1–3.

Vegetative filaments simple or but slightly branched, 16–21μ broad.

The plant forms small, dark brown tufts 1–2 mm. high on the fruiting tips and upper branches of *Fucus harveyanus*. The whole plant is smaller and does not form the dense rounded tufts as in the type. San Pedro, California, Aug., 1896.

13. **Ectocarpus paradoxus pacificus,** var. nov.

PLATE XVIII, FIGS. 4-7.

Erect filaments arising from a compact mass of creeping ones, 25-40μ broad, divergently branched, branches long, bearing above several short, pointed branchlets; cells about as long as broad, near the extremities one-half as long, slightly constricted; plurilocular sporangia cylindrical, ovate or lanceolate, obtuse or abruptly pointed at the apex, borne laterally on the main stem and branches on a long or short stalk, 70-150μ x 25-50μ; unilocular sporangia on short stalk or intercalary, globose, about 30μ in diameter.

Forming small tufts 2-5 mm. high on *Fucus evanescens,* most abundant on the fruiting tips; differs from the type in its smaller size, in the branching which is never opposite, and in the plurilocular sporangia which are longer and more pointed.

14. **Ectocarpus mucronatus,** sp. nov.

PLATE XIX.

Plant light olive-green, attached at base by a few long, colorless, creeping filaments. Erect filaments 1-5-6 cm. high, loosely intertwined, terminated above by a short, colorless hair, unbranched at base; main filament 30-40μ broad; cells one-third to as long as the diameter, below three times as long, not at all constricted, branches spreading, numerous, scattered, mostly short and pointed; chromatophores disk-form, numerous in each cell; plurilocular sporangia sessile, numerous, 50-155μ x 20-30μ, ovate or lanceolate, short-acuminate, borne on both the main filament and the branches.

Attached to *Zonaria tournefortii* which was washed ashore. San Pedro, California.

Also on *Petrospongium berkleyi* collected on rocks near San Pedro by A. J. McClatchie (1273).

15. **Ectocarpus corticulatus,** sp. nov.

PLATE XX.

Plant erect, 3 mm. to 3 cm. and more high, arising from a small, compact network of creeping filaments. Main filament 90-120μ broad, irregularly much branched below, above somewhat dichotomously branched; branches 50-70μ wide, spreading, irregular, some long and bearing many short branches, others short and few celled, all ending abruptly; the main stem and the branches densely corticated; cells one-half to as long as broad, but slightly constricted; chromatophores few, large, band-form, each containing several pyrenoids; plurilocular sporangia very variable in size and shape, lanceolate or narrowly ovate, short stalked or sessile, mostly 30-40μ x 12-18μ (occasionally 50–70μ x 20–30μ), most abundant on the upper side of the ultimate branches but found also along the main stem and primary branches, below apparently arising from the corticating filaments.

Forming small, loose masses, 2 mm. to 5 or 6 cm. high, on *Desmarestia ligulata*, Monterey; on *Zostera* leaves with *E. granulosus*. San Pedro, California.

16. **Ectocarpus mitchellæ** *Harv.*

PLATE XXI, FIGS. 1 AND 2.

Ectocarpus mitchellæ HARV., Ner. Bor.-Amer., I, 1851, 143.
Ectocarpus indicus SOND., Zoll. Verz. Ind. Arch. ges. pflanz., 3, 1854.

Plant arising from long, creeping filaments 10–15μ wide; cells 5–10 times as long as the diameter. Erect filaments unbranched below, bearing above many alternate branches which have numerous short, spreading branchlets; branches and branchlets pointed or ending in a short hair; main filament 25–40μ wide, 1–3 times as long as the diameter; chromatophores numerous, small, disk-form; plurilocular sporangia cylindrical, obtuse, 50–100μ x 18–35μ, sessile, mostly secund on the upper side of the branches.

Forming light olive-green tufts 1–2 cm. high on rocks at the low tide level. San Pedro, California.

A careful study of the plant showed it to be identical with the figures and description of *E. indicus* given by Askenasy in Ein. Austr. Meersalg., 8, 1894. The same plant was received from Prof. McClatchie named *E. mitchellæ*. From a careful comparison of the plates and descriptions of *E. indicus* and *E. mitchellæ*, the two species seem to be identical. Mr. F. S. Collins has received the same plant from San Diego, where it has been called *E. virescens* Thuret. He has "no doubt that Harvey's and Thuret's species are the same."

17. **Ectocarpus siliculosus parvus**, var. nov.

PLATE XXII.

Plants tufted, erect, 1–2 cm. high; primary branches numerous, alternate, gradually contracted above into long hyaline hairs, bearing many short, pointed branches. Cells with the main filament 21–30μ broad, 1–3 times as long, slightly constricted at the joints; plurilocular sporangia narrowly lanceolate or conical, 120–290μ x 20–27μ, pointed and often tipped with a long hair, borne on a long or short stalk, abundant on the main filament and the primary branches; unilocular sporangia ovate or elliptical, usually sessile, 35-55μ x 20-27μ, sometimes on the same filament with the plurilocular sporangia.

Forming a yellow fleece on sand-colored rocks. San Pedro, California, 1895. Collected by W. A. Setchell (1213).

The Pacific plant differs from the type and from the form *hiemalis* in the smaller size of the vegetative parts and the plurilocular sporangia; from the form *arctus* (Kuetz.) Kuck. in the much narrower vegetative filaments and larger plurilocular sporangia.

18. **Ectocarpus confervoides** (*Roth*) *Le Jol.*

Ectocarpus confervoides (ROTH) LE JOL., List. Alg. Mar. Cherb., 75, 1880.

Plants 2 cm. to 3 or 4 dcm. long, attached to the substratum by horizontal creeping filaments, often entangled at the base; branches alternate, gradually tapering, often corticated, cells of the larger branches 35-50μ broad, as long to one-half as long as the diameter; plurilocular sporangia narrowly lanceolate and subulate to ovate and acute, sessile to short or long stalked; unilocular sporangia ovate, globose, or elliptical.

Of this variable, cosmopolitan species two forms have been collected on the Pacific coast.

19. **Ectocarpus confervoides pygmæus** (*Aresch.*) *Kjellm.*

PLATE XV, FIGS. 5-9.

Ectocarpus confervoides pygmæus (ARESCH.) KJELLM., Handbk. I, 1890, 76.

Erect filaments arising from a compact substratum of short creeping filaments, unbranched or bearing above a few divergent, long branches, in figures 12-25μ in diameter, not at all narrowed above; cells at base 2-3 times as long as the diameter, above once to one-half as long; chromatophores large, irregular, band-form, few in each cell; plurilocular sporangia lateral and terminal, sessile or short stalked, lanceolate or conical, rather obtuse at the apex, 60-100μ x 20-30μ; unilocular sporangia lateral, abundant, ovate or globose, 25-40μ broad, often two to many seriate.

Forming an olive-brown, velvety covering on *Desmarestia ligulata* and *Dictyoneuron Californicum*. Pacific Grove, California.

20. **Ectocarpus confervoides variabilis,** form. nov.

Plate XXIII.

Plant 2-8 mm. high, sparingly branched, branches alternate, distant, long drawn out at the tip, cells 10–30μ broad, 1-3 times as long as the diameter, not at all constricted; chromatophores large, band-form, few in each cell; plurilocular sporangia abundant, lanceolate, fusiform or narrowly ovate, usually on a one- to few-celled stalk, borne laterally on the main stem or branches, occasionally arising by a short stalk from the creeping filaments; 75–90μ x 16–35μ; unilocular sporangia globose or ovate, 15–35μ wide, single or 2–15 seriate, borne on a one- to three-celled stalk, mostly on the same filament with the plurilocular sporangia but much less common.

Forming light olive-brown tufts on *Laminaria andersonii, Iridæa laminarioides, Macrocystis pyrifera, Egregia menziesii, Nemalion multifidum, Alaria esculenta,* and *Lessonia littoralis.*

A very common species and one that varies considerably in the size of the vegetative filament and the plurilocular sporangia.

21. **Ectocarpus penicillatus** *C. Ag.*

Plate XXI, Figs. 3 and 4.

Ectocarpus penicillatus C. Ag., Syst. Alg., 1824, 162.

Plant densely tufted, dark olive-green, 1-4 cm. high; main stem and few of the primary branches corticated; cells of the primary branches 20–35μ broad, a little shorter than the diameter; secondary branches somewhat secund, short and very numerous; plurilocular sporangia linear or linear-lanceolate, sessile pedicillate, acute 85–165μ x 12–20μ, borne mostly on the secondary branches.

A dark, olive-green plant forming dense tufts on *Desmarestia ligulata.* Pacific Grove, California.

22. **Ectocarpus tomentosus** (*Huds.*) *Lyngb.*

Plate XXIV, Figs. 1 and 2.

Ectocarpus tomentosus (Huds.) Lyngb., Hydrophyt. Dan., 1819, 132.

Plants forming tufts 1-4 cm. long, of densely interwoven, irregularly, much branched filaments forming a rope-like spungy mass. Filaments 6–8μ wide; cells 2-4 times as long as the diameter; branches long, divergent, the ultimate ones standing at right angles, curved at the tip; chromatophores large, irregular, band-form, few; plurilocular sporangia linear-oblong, 40–110μ x 12–18μ, given out at right angles to the filament, sessile or occasionally short-pedicillate, often curved; "[1] sporangia almost elliptical, on short pedicels."

---

[1] Hauck in Rab. Crypt. Fl. Vol., II, 330.

Common on *Fucus evanescens* and *Fucus harveyanus*. Monterey, California.

One of the commonest Pacific coast species; where it occurs in large quantities it appears to be very destructive to the "host" plant. The tufts average much smaller than those of the Atlantic coast specimens.

23. **Ectocarpus granulosus** (*Engl. Bot.*) *Ag.*

PLATE XXIV, FIGS. 3-5.

Ectocarpus granulosus (ENGL. BOT.), AG., Sp. Alg. II, 1828, 45.

Filaments 1-8 cm. high; main branches mostly opposite, many of them corticated, cells 40-75μ broad, one-half to as long as the diameter, secondary branches opposite, short, given off at wide angles, curved at the tips; ultimate branches secund, short and acute; plurilocular sporangia abundant, sessile on the secondary and ultimate branches, broadly ovate, obliquely truncate at the base, 60-100μ x 30 to 60μ; unilocular sporangia wanting.

On rocks, *Costaria mertensii*, and *Nereocystis lütkeanus*, Pacific Grove, California; and on *Zostera marina*, San Pedro, California.

The Californian plant agrees with Dr. Farlow's variety *tenuis* in the size and branching of the vegetative filaments, but has the plurilocular sporangia of the type.

24. **Pylaiella** *Bory.*

Pylaiella BORY, Dict. Class. IV, 1825, 393.

Plant filiform, monosiphonous, more or less branched, attached to the substratum by more or less branched creeping filaments. Unilocular sporangia globose, seriate, arising from the transformation of a part of the vegetative cells of any of the branches, opening laterally; plurilocular sporangia oblong or cylindrical, intercalary, opening laterally, or occasionally terminal and opening at the apex, single or many seriate.

25. **Pylaiella littoralis densa,** form. nov.

PLATE XXV, FIGS. 1 AND 2, 5 AND 6.

Vegetative filaments below densely intertwined into rope-like masses, penicillate above, branched. Branches numerous, long, opposite or alternate, bearing many short branchlets; main filament and branches 18-25μ, cells 1-3 times as long as the diameter, not at all constricted; unilocular sporangia globose, 2-15 in a series, most abundant in the branches and branchlets, 21-30μ in diameter; plurilocular sporangia scarce, mostly in the main filament, 20-50μ x 20-30μ, 2-10 or more in a chain.

The plant forms dense, ropey, dark olive-brown masses 3–8 cm. long on *Fucus* sp. Ilwaco, Washingion, near the mouth of the Columbia River.

On the southern Californian coast material was collected of what seems to be another well marked variety of *P. littoralis*. As the material was sterile I forbear making any further additions to the long list of varieties and forms of this species.

The description of the plant is given below:—

26. **Pylaiella littoralis,** var.

PLATE XXV, FIGS. 3 AND 4.

Plant composed of loosely intertwined, light olive-green filaments of indefinite length, bearing a few long attentuate branches 20–70μ broad, ½–2 times as long as the diameter, not at all narrowed upwards. Main filament and the branches bearing many one- to few-celled branchlets which stand at right angles to the filament.

Forming a light yellow flocculent mass of a few cm. long on *Amphiroa*. San Pedro, California, Aug., 1896.

II.—SPHACELARIACEÆ AND ENCŒLIACEÆ OF THE PACIFIC COAST.

Family SPHACELARIACEÆ (*Decne.*) *Kuetz.*

Sphacelariaceæ (DECNE.) KUETZ., Linn., XVII, 1843, 93.

Plant body arising from a larger or smaller mass of cellular tissue, polysiphonous, more or less branched, increasing by the division of a large terminal cell; reproductive organs (unilocular and a plurilocular sporangia) arising on a longer or shorter stalk directly from the basal tissue or borne laterally on the erect filaments.

The family includes at present about eleven genera, only one of which has been collected on the California coast.

27. **Sphacelaria** *Lyngb.*

Sphacelaria LYNGB., Hydrophyt. Dan., 103, 1819.

Plant olive-brown, tufted, filamentous, branching; basal plate fastened to rocks or in the tissue of other algæ as a substratum; both the axis and branches terminated by a large apical cell which by transverse, longitudinal, and oblique division produces a plant body, the external surface of which is composed of rectangular cells arranged in regular, transverse bands. Unilocular and plurilocular sporangia mostly extra-axillary on the branches, on a one- to few-celled stalk; propagula known in most species, on separate plants.

28. **Sphacelaria tribuloides** *Menegh.*

Plate XXVI.

Sphacelaria tribuloides Menegh., Lett. al Corinaldi 2, N. 1; Alg. Ital., 336, 1842.

Plant densely tufted, olive-brown; primary branches somewhat dichotomous, appressed, bearing above numerous alternate or opposite branches. Main filament composed of 4-8 siphons, 50–70μ wide, the external cells 1-½ as long as the diameter of the filament; propagula obcordate on the upper branches; plurilocular sporangia elliptical or obovate, 75–150μ x 50–70μ, on a one- to four-celled stalk.

The plant forms dense tufts 1–3 or 4 cm. high, on rocks at the low tide line. Collected by Prof. A. J. McClatchie.

? Is name right.

Sphacelaria didichotoma, sp. nov.

Plate XXVII.

Plant forming small, cushion-like masses 2-4 mm. high. Erect filaments arising from a small compact substratum, bearing many long, spreading, alternate branches; main filament 25-35μ broad; external cells ½ to as long as the diameter of the filament; axis of the filament of four or five siphons; propagula abundant, large, twice dichotomus, often standing at right angles to the main filament; stalk 2-300μ long, main branches 100–200μ. long.

Forming small, compact tufts on *Melobesia* and *Ahnfeldtia.* Carmelo Bay, California.

Family ENCŒLIACEÆ (*Kuetz.*) *Kjellm.*

Encœliaceæ (Kuetz.) Kjellm., Phyc. Gener., 336, 1843.

Reproductive organs developed from superficial cells or from one of the divisions of a superficial cell; plant tissue of parenchymatous structure; growth intercalary, growing point near the base.

SYNOPSIS OF GENERA.

Plant body undifferentiated—of similar structure throughout.
  Plant thin, a flat, leaf-like membrane .... *Homeostroma.*
Plant body differentiated—composed of at least two kinds of cells.
  Sporangia sunken beneath the surface, plant hollow, cylindrical, or club shaped .... *Coilodesme.*
  Sporangia on the surface.
    Paraphyses none, plant a leaf-like membrane.
      Central layer of tissue composed of large, irregularly rounded cells .... *Phyllitis.*
      Central layer of tissue a loose web of slender branching filaments .... *Endarachne.*
      Central layer of tissue composed of a smaller, compact layer of cells reproducing by unilocular sporangia ...... *Halorhipis.*
    Paraphyses unicellular.
      Plant body hollow, cylindrical .... *Scytosiphon.*
      Plant body hollow, irregulary rounded or oval ..... *Colpomenia.*
    Paraphyses multicellular; plant body rounded or oval, plants mostly aggregated .... *Soranthera.*

30. **Homeostroma** *J. Ag.*

Homeostroma J. AG., Anal. Alg. Cont., III, 1896, 3.
Punctaria GREV., Syn. in Alg. Brit., XLII, 1830, (in parte.)

Plant body membranaceous, of several (2-7) similar layers of cuboidal cells. Unilocular and plurilocular sporangia oblong or oval, formed from the outer layer of cells; paraphyses none, furnished with numerous clusters of hairs.

31. **Homeostroma latifolium** *J. Ag.*

PLATE XXX, FIGS. 4 AND 5.

Homeostroma latifolium J. AG., l. c.
Punctaria latifolia, Born. et Thur., Étud., phycol. p. 13.

Plant body arising from a minute disk, lanceolate-obovate, 1-5 dcm. long, tapering below to a short stalk 2-10 mm. long, olive-green, plaited on the edges; tissue consisting of 4 or 5 rows of cells; unilocular and plurilocular sporangia scattered, on the same plant.

Attached to leaves of *Zostera marina* washed ashore at Monterey, California.

32. **Coilodesme** *Strœmf.*

Coilodesme STRŒMF., Eing. Meersalg. Isl., 173, 1886.

Plant body hollow, cylindrical or oval, on a short, solid stalk which arises from a minute disk-like base composed of two (or three) layers of tissue, an inner layer of large, mostly colorless, cylindrical cells and an outer layer of smaller colored cells. Unilocular sporangia solitary, scattered, developed from the outer layer of cells but surrounded by the continued growth of the outer layer of tissue; plurilocular sporangia, hairs, and paraphyses wanting.

33. Coilodesme californica (*Rupr.*) *Kjellm.*

PLATE XXIX, FIGS. 1–3.

Coilodesme californica (RUPR.) KJELLM. in Engl. and Prantl. Natürl. Pflanzenfam., Lief. 86, 202, 1893.

Adenocystis californica RUPR., Tange. Ochot, 29.

Plant olive-green, hollow, inflated, thin membranaceous or papery, cylindrical or ovoid, 2–6 dcm. long, ½–1 dcm. wide, abruptly contracted below into a short, solid stalk 1–3 mm. long. Sporangia abundant, scattered over the whole surface of the plant, ovate, 25–30μ x 12–15μ.

Abundant on the upper branches of *Cystoseira osmundacea.* Pacific Grove and San Pedro, California.

The plants appear in June as minute, smooth, air-tight sacks filled with a gelatinous liquid which is formed from the degeneration of the central tissue. They gradually increase in size, soon becoming wrinkled and folded and finally torn, especially at the ends. The walls are thin and delicate and are composed of two layers of poorly differentiated tissue. The single outer row of cells is rounded and though not well developed it is easily distinguished from the hypodermal layer. The hypodermal layer is composed of two or three layers of irregularly rounded or quadrangular cells; beneath this is the central layer composed of three or four layers of large cylindrical cells surrounded by many smaller ones. The hypodermal layer is supplied with one or two large oval chromatophores, and occasionally one is found in the central layer of tissue.

34. Halorhipis[1], gen. nov.

PLATE XXVIII.

Plant body solid, leaf-like, arising from a disk-like base, composed of two layers of tissue, the outer layer consisting of 2–3 rows of cuboidal cells, the inner layer of several rows of large, cylindrical cells; reproducing by unilocular sporangia collected in sori which are distributed over the whole surface of the plant; hairs numerous, forming the center of the sori; plurilocular sporangia and paraphyses wanting.

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[1] ἅλς=sea, ῥιπίς=fan.

35. **Halorhipis winstonii** (*Ands.*)

PLATE XXVIII.

Punctaria winstonii ANDS., Some New and Old Algæ, Zoe IV, 1896, 358.

Plant membranaceous, olive-brown, lanceolate, obovate, or spatulate, 8 cm.–2 dcm. long, 2–5 cm. broad, usually frayed and torn at the end, gradually narrowed below into a short stalk (2–8 mm. long). Unilocular sporangia elliptical, obovate, or pyriform, 30–45μ x 20–30μ, sori numerous, forming irregular, linear patches of various sizes.

On *Egregia menziesii* and on rocks at low tide level. Carmelo Bay, California.

In 1895 a study was made of material received from Dr. Anderson, and the distinctness of this plant from *Punctaria* was at once noticed. During the summer of 1896 several trips were made to Carmelo Bay, fresh material in all stages of growth was obtained from the same locality where the type specimens were collected by Mr. Winston and sent to Dr. Anderson.

36. **Phyllitis** *Kuetz.*

Phyllitis KUETZ., Phyc. Gener., 342, 1843.

Plant body solid, membranaceous, lanceolate or linear, tapering toward the base to a short round stem, of two layers of tissue, the cortical layer of small cuboidal cells, the inner layer of oblong colorless cells. Unilocular sporangia linear, covering the entire surface of the plant; plurilocular sporangia and paraphyses wanting.

37. **Phyllitis fascia** (*Muell.*) *Kuetz.*

PLATE XXX, FIGS. 1–3.

Phyllitis fascia (MUELL.) KUETZ., l. c.
Fucus fascia OEDER, Fl. Dan. Tav., 768, 1761.

Plant single or clustered, arising from a disk-like base, 2–30 cm. high, 1–5 cm. broad, linear, lanceolate, or elliptical, narrowed at base into a short stem, or sessile.

Two forms of this variable species have been collected on the Californian coast:

A.—Plants gregarious, linear or oblanceolate, 3–15 cm. long, 3 mm. to 1 cm. wide, gradually narrowed to a short stalk.

On rocks and *Phyllospadix* sp. Monterey and Pacific Grove, California.

B.—Plants single or somewhat clustered, broadly lanceolate, plaited on the margin, 5–9 cm. long, 1-2 cm. broad, basal stalk very short or none. San Pedro and Pacific Grove, California.

In external appearance this form is almost undistinguishable from *Endarachne.*

38. **Endarachne** *J. Ag.*

Endarachne J. AG., Anal. Alg. Cont., III, 1896, 26.

Plant plain, simple, without a rib, composed of three layers of tissue; the axillary tissue of slender, intertwined, articulate filaments, on each side of this a single row of slightly coherent hypodermal cells, outside of which there is a double layer of small cells, slightly elongated in a longitudinal direction; reproducing by plurilocular sporangia scattered over the whole surface of the plant.

39. **Endarachne binghamiæ** *J. Ag.*

PLATE XXX, FIGS. 6 AND 7*

Endarachne binghamiæ J. AG., l. c., 27.

Plant clustered, smooth, olive-brown, 5 cm. to a dcm. or so high, 1–2 cm. broad, obtuse above, tapering below to a very short stalk.

A single dried specimen of this plant, collected at San Pedro, California, was received from Prof. McClatchie about the time of the publication of Agardh's description; figure 7 was drawn before the publication was received. In external appearance the plant is almost undistinguishable from the broader form of *Phyllitis fascia;* it is, perhaps, a little thinner and more abruptly contracted at the base. Agardh places it between *Scytosiphon* and *Phyllitis.* It has been suggested that perhaps all that has been called *Phyllitis* on this coast is really *Endarachne.* A study of many specimens from Monterey and San Pedro seems to show that *Phyllitis* is quite abundant and *Endarachne* is found, so far at least, only on the Southern coast.

40. **Scytosiphon** *Ag.*

Scytosiphon AG., Sp. Alg., I, 1823, 160.

Plant body filiform when young, tubular when mature, composed of two layers of tissue, the outer of small quadrangular cells, the inner layer of thick-walled, vertically elongated, colorless cells. Plurilocular sporangia developed from the cortical layer of cells, covering the whole surface of the plant; paraphyses single celled, oblong-ovate, sometimes wanting.

* see letter of Bornet 6 Nov. 1899 where he says that Pl. XXX f. 7 looks very much like a Grateloupia and not like a Phaeosporée.

41. **Scytosiphon lomentarius** (*Lyngb.*) *J. Ag.*

PLATE XXXI, FIGS. 8-10.

Scytosiphon lomentarius (LYNGB.), J. AG., l. c., 126.
Chorda lomentaria LYNGB., Hydrophyt. Dan., 74, 1819.

Plant body unbranched, tubular, arising from short (1cm. long) filiform stalks, 1-4 dm. long, 1-10 mm. thick; constrictions regular and frequent, occurring at long intervals or entirely wanting.

On rocks, Pacific Grove, Monterey, Santa Cruz, San Pedro and San Diego, California (Averill's set).

One form found mostly below the low tide line is broad and short and the constrictions are regular and frequent; another form occurring on overhanging rocks at or above the high tide line approaches the variety *complanatus* of Rosenvinge. It is longer and more slender than the preceding form and the constrictions are seldom present. Between these two there is such an imperceptible gradation that it is difficult to draw a line of separation.

42. **Scytosiphon bullosus,** sp. nov.

PLATE XXXI, FIGS. 1-7.

Plant erect, membranaceous, hollow, dark olive-green, cylindrical to broadly ovate, 1-5 cm. high, 1-2 cm. broad, simple or lobed above, narrowed at base into a broad disk-like attachment; surface at first smooth, wrinkled, and often torn with age. Plurilocular sporangia, paraphyses, and hairs undistinguishable from those of *S. lomentarius.*

On rocks, exposed at low tide with *Leathesia* and *Ulva.* Pacific Grove, California, Aug., 1896.

A very variable species but apparently quite distinct from *S. lomentarius.*

43. **Colpomenia** *Derb. & Sol.*

Colpomenia DERB. & SOL., Phys. Alg., p. 11, 1856.

Plant body globose or oval, hollow, the walls entire or irregularly torn, composed of two layers of tissue; the inner layer consisting of a few large, rounded, colorless cells, the outer of small quadrangular colored cells. Plurilocular sporangia at first forming sori around the hairs, soon spreading over the whole surface of the plant, interspersed with unilocular, clavate, paraphyses.

44. Colpomenia sinuosa (*Roth*) *Derb. & Sol.*

PLATE XXXII, FIGS. 7 AND 8.

Colpomenia sinuosa (ROTH) DERB. & SOL., l. c.
Ulva sinuosa ROTH, Cat. Bot., III, 327, Tab. 12, 1806.
Asperococcus sinuosus BORY, of Anderson's list, etc.

Plant body sessile, thin, membranaceous, 4 cm. to a dcm. high, sunken and occasionally irregularly torn in the older forms, tissue .255 mm. in thickness, the outer row of cells consisting of one or two rows of cuboidal, colored cells, inner layer of two rows of large roundish cells; plurilocular sporangia 20 x 7μ, often containing the zoospores cells in two rows; paraphyses a little shorter and broader, 17 x 10μ.

The plant is usually found attached to other seaweeds and seems to prefer quiet coves. Carmelo Bay, Monterey Bay, and San Pedro, California.

45. Colpomenia sinuosa expansa, form. nov.

PLATE XXXII, FIGS. 4-6.

Plants aggregated, forming an indefinite expanded mass on rocks; plant tissue .425 mm. in thickness, the inner layer of tissue being composed of 5-7 rows of cells.

Santa Catalina Island near Avalon Bay, California.

46. Colpomenia tuberculata, sp. nov.

PLATE XXXII, FIGS. 1-3.

Plant coriaceous, olive-brown, sessile, hollow, hemispherical, 5 cm. to a dcm. or more in diameter; surface deeply convoluted, wrinkled, and folded, the whole surface covered in the mature plant with blunt tubercles 1 mm.-10 mm. high, 1-5 mm. broad. Plurilocular sporangia 22-25μ x 3-4μ, composed of 6-8 zoosporal cells in a single row; paraphyses 22 x 5μ, remaining after the zoospores have escaped.

Near San Pedro, California.

The plant forms large rounded brain-like masses attached to rocks by the whole under surface; the outer layer of tissue .65-.80 mm. in thickness, composed of 3-5 layers of cuboidal cells, the inner 5-8 rows of large irregular cells. The plant tissue is of firmer texture and much thicker than in *C. sinuosa*. The structure of the tissue is very similar to that of *Hydroclathrus cancellatus*.

47. **Soranthera** *Post. & Rupr.*

Soranthera POST. & RUPR., Illustr. Alg., 19, 1840.

Plant body hollow, inflated, composed of two layers of tissue, with a cortical layer of small, colorless cells, the inner of large, nearly colorless cells. Unilocular sporangia forming sori which are distributed over the entire surface of the plant; paraphyses unicellular, hairs abundant in the center of each sori; plurilocular sporangia unknown.

48. **Soranthera ulvoidea** *Post. & Rupr.*

PLATE XXIX, FIGS. 4 AND 5.

Soranthera ulvoidea POST. & RUPR., l. c.

Plants gregarious, sessile, membranaceous, olive-green, globose or oval, 2–8 or 10 cm. high. Sori very abundant, evenly and closely distributed over the whole surface of the plant. Unilocular sporangia clavate, 70–100μ long, surrounded by numerous linear paraphyses which are nearly twice as long.

In sheltered coves, usually on *Rhodomela larix*, occasionally on rocks and other algæ. Monterey, California.

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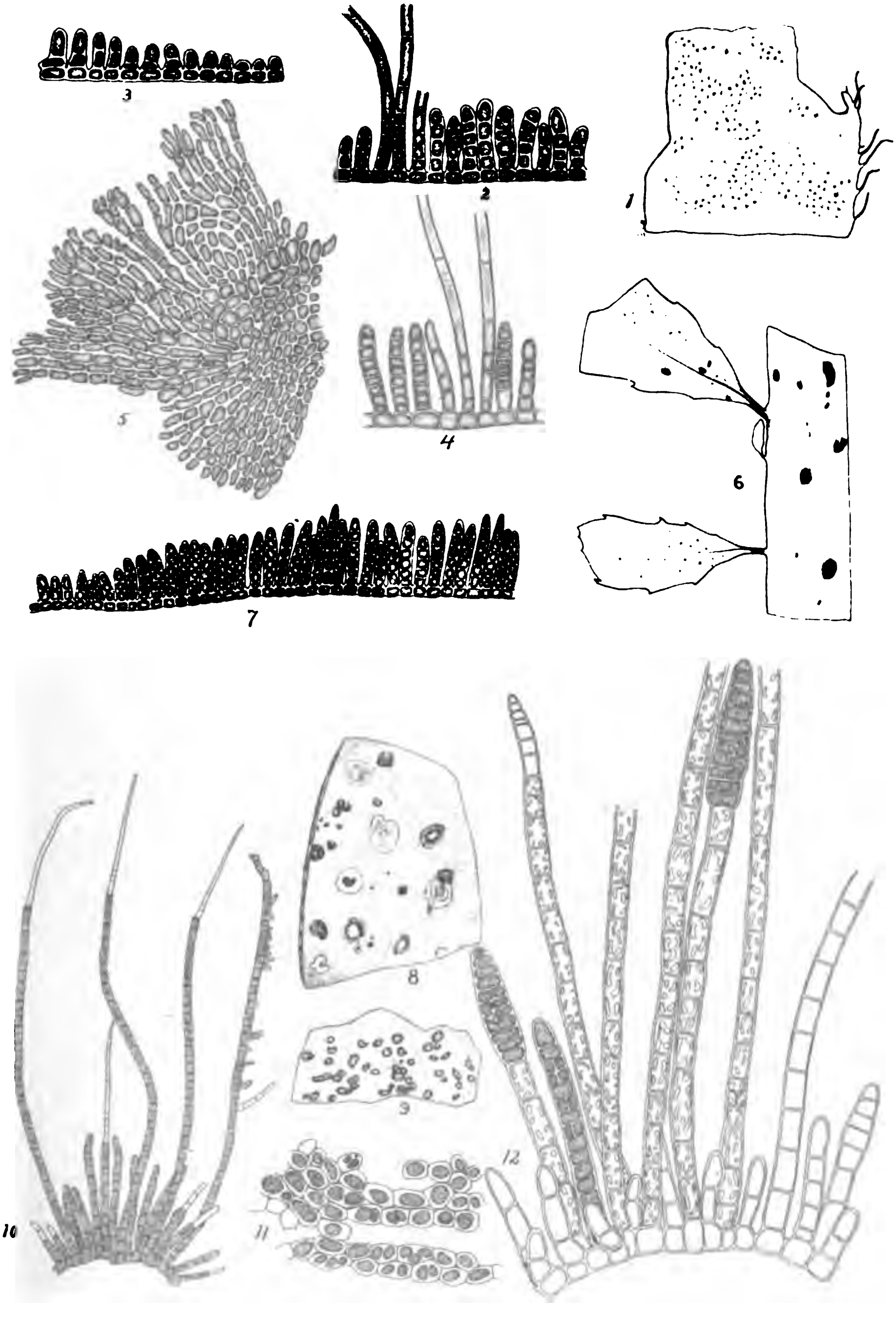

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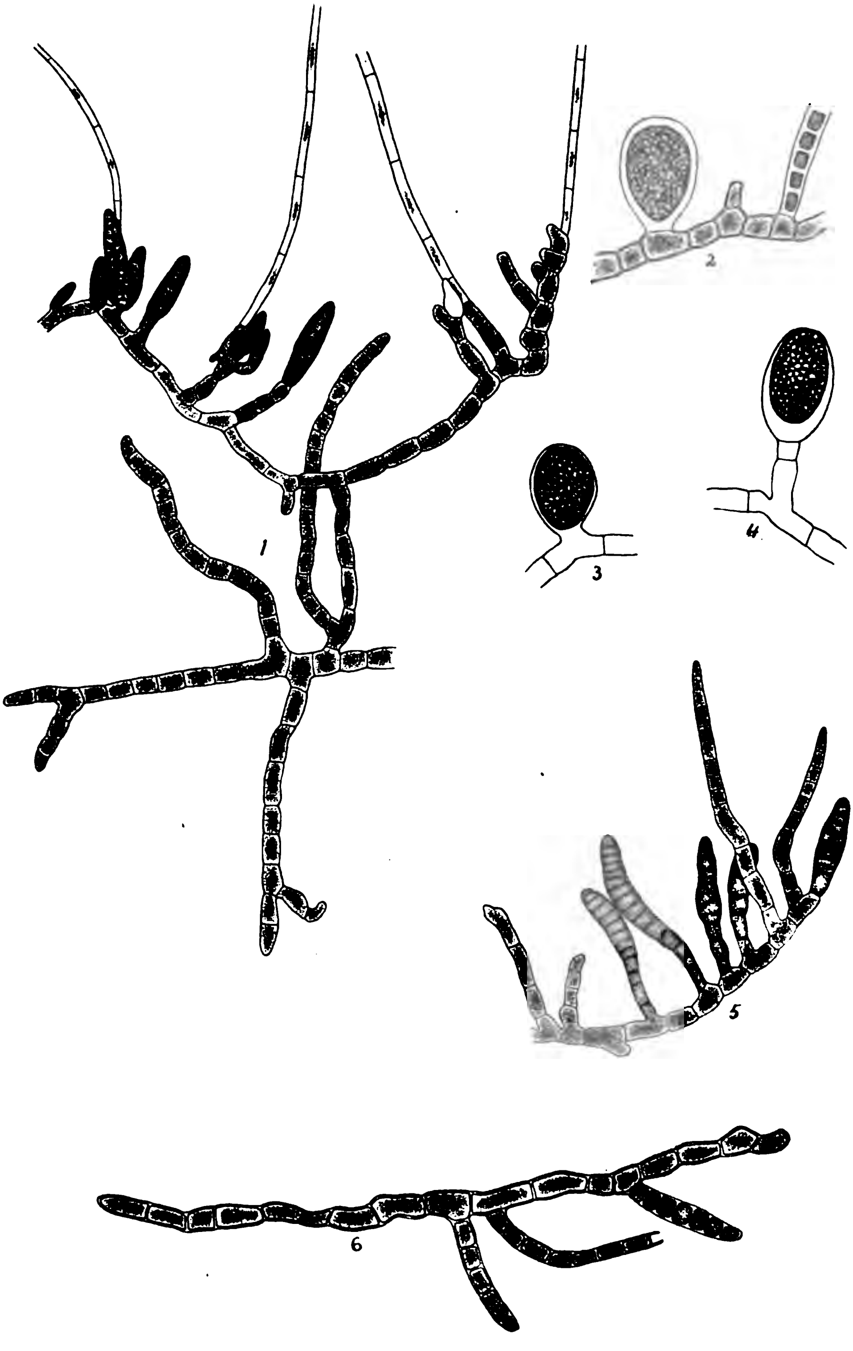

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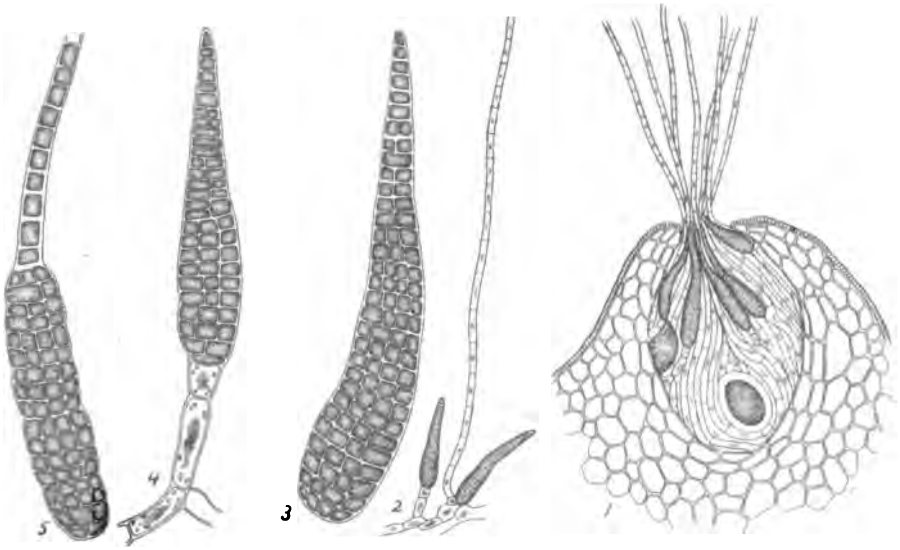
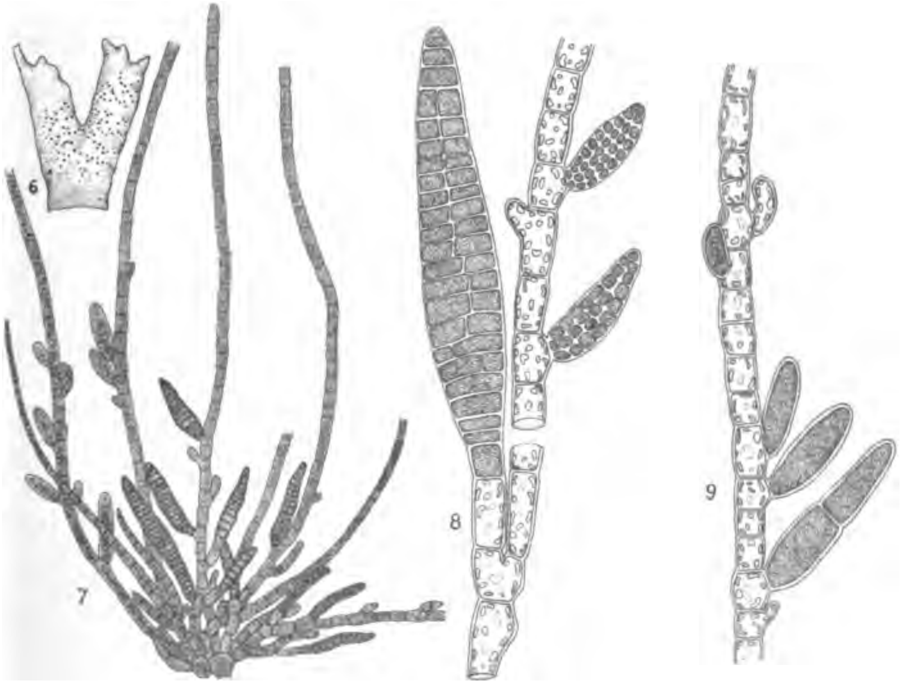
STREBLONEMA [illegible]





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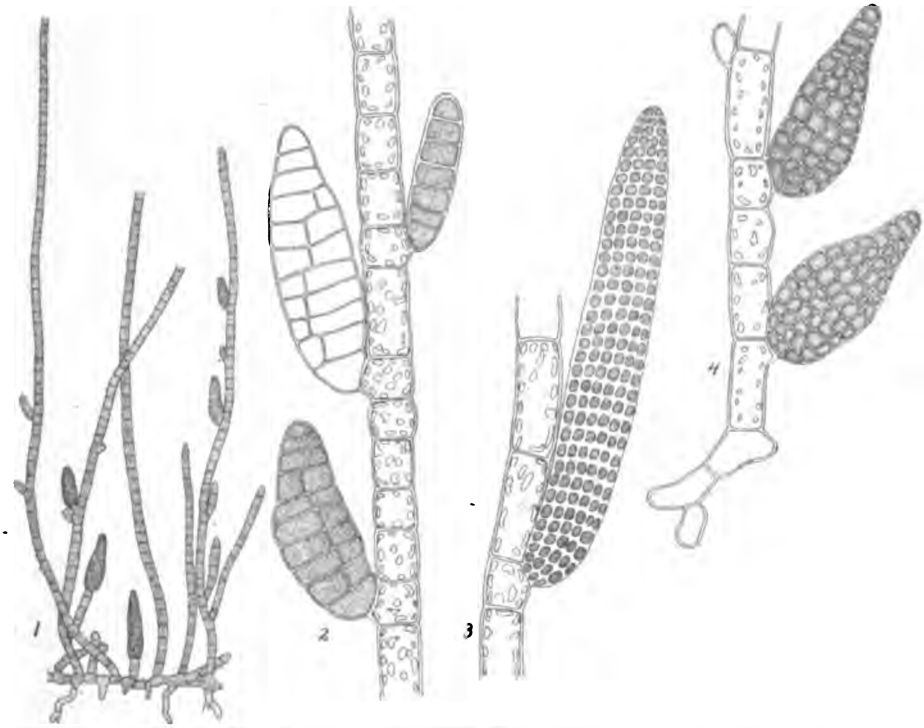
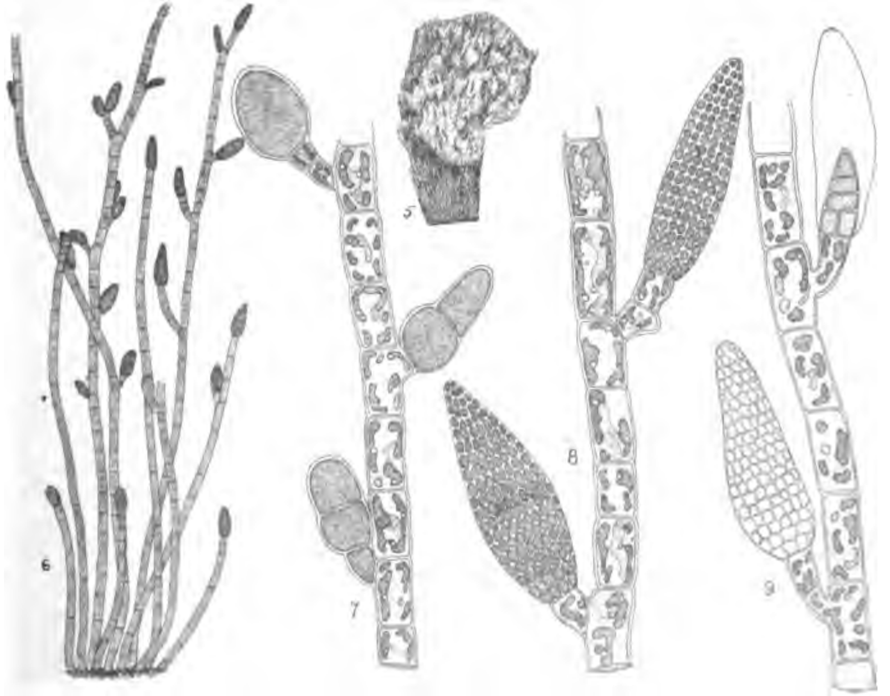
FIGS 1 - 5 ECTOCARPUS ACUMINATUS, SP NOV

FIGS 6 - 9 ECTOCARPUS ELLIPTICUS, SP NOV





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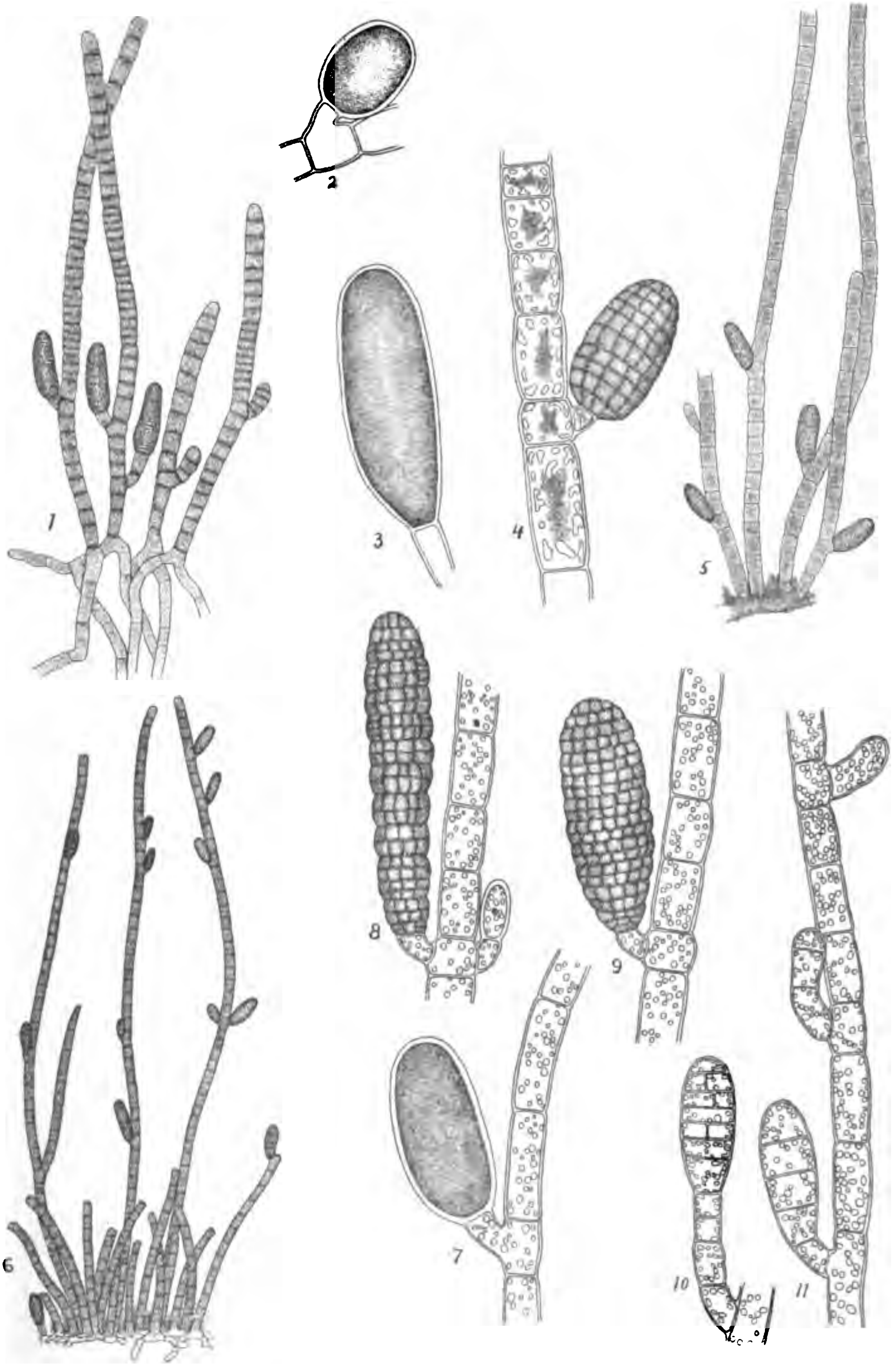
FIGS. 1–4. [illegible]

FIGS. 5–9. [illegible]



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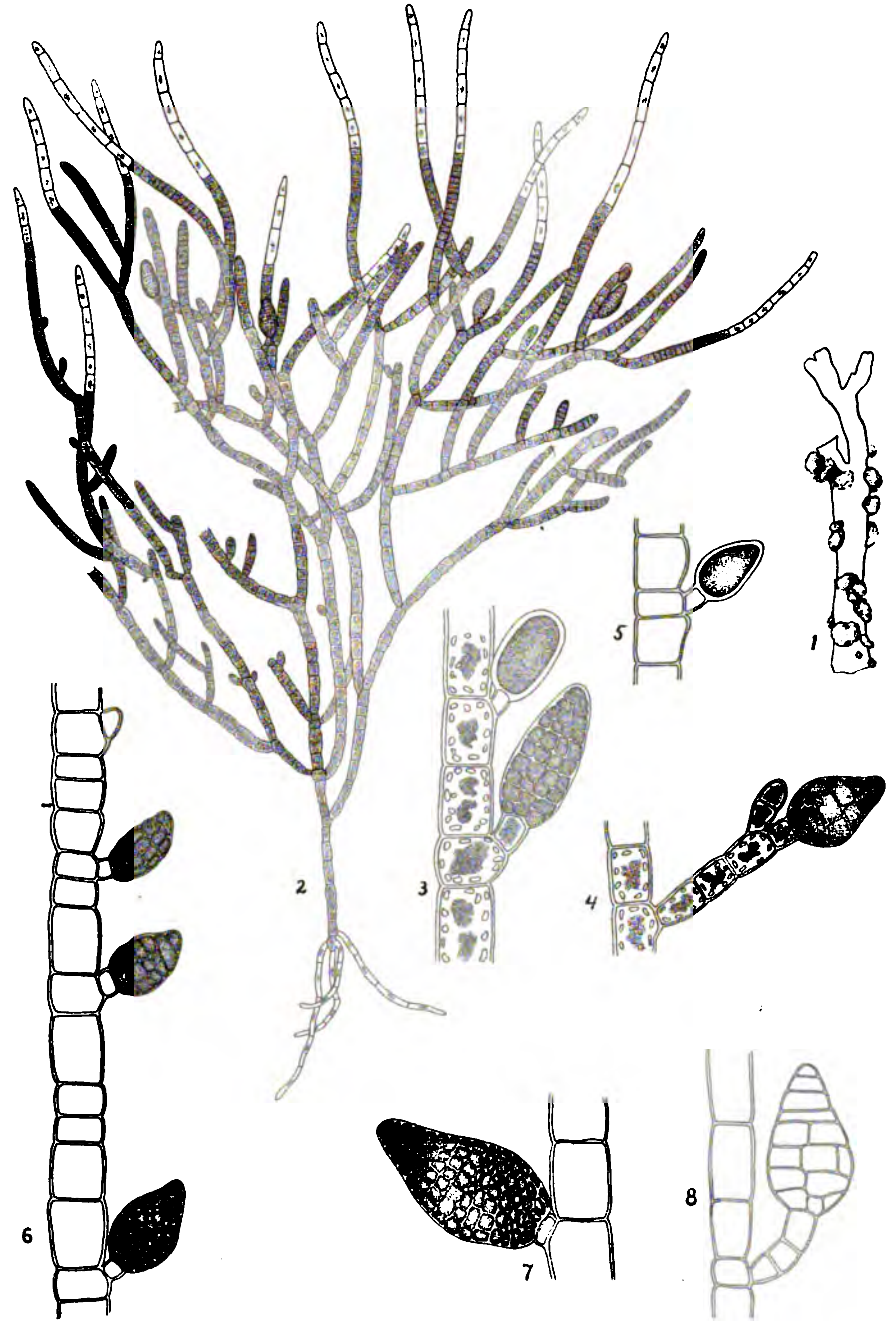
ECTOCARPUS CYLINDRICUS, SP. NOV.



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ECTOCARPUS HEMISPHERICUS, SP. NOV.

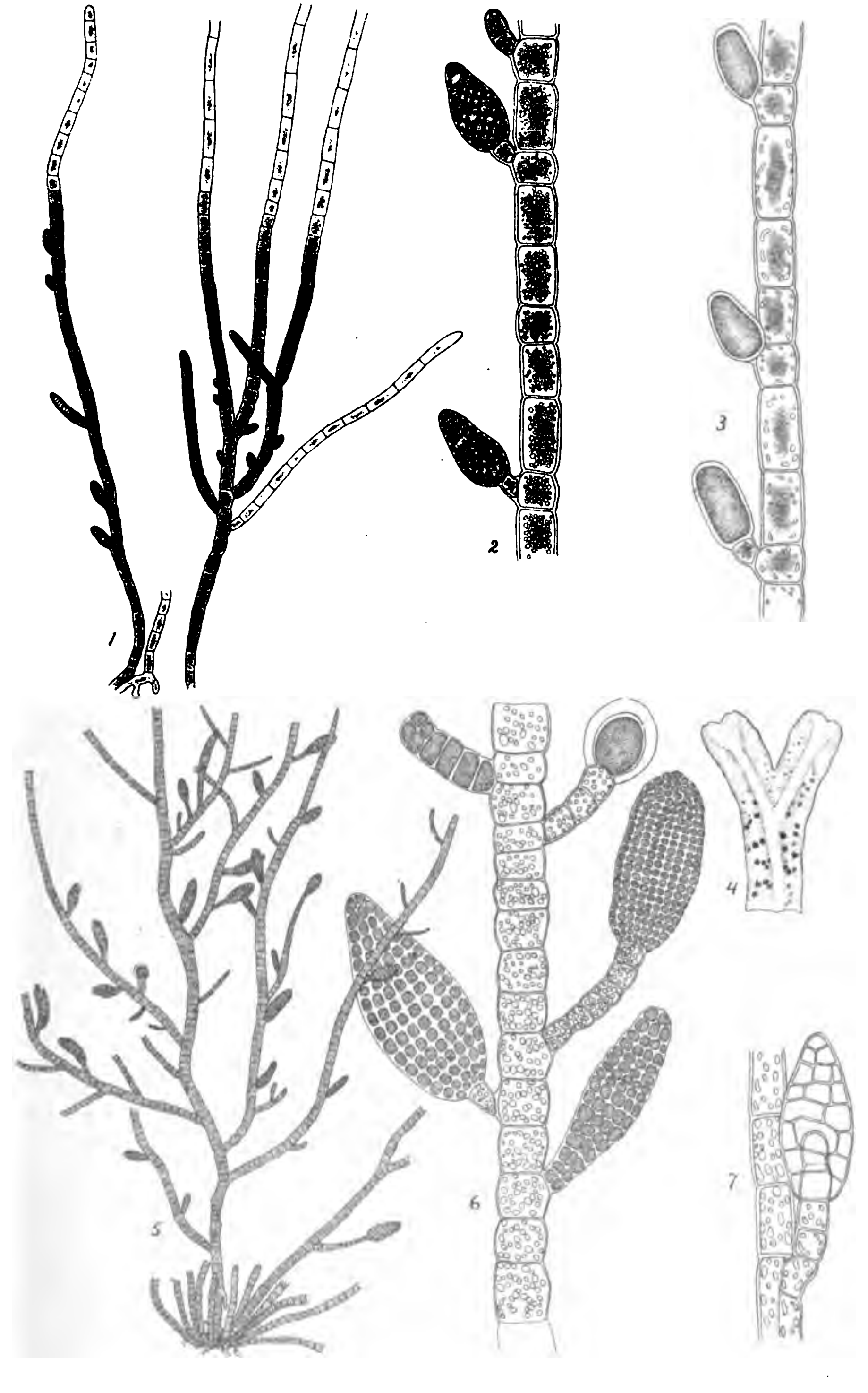

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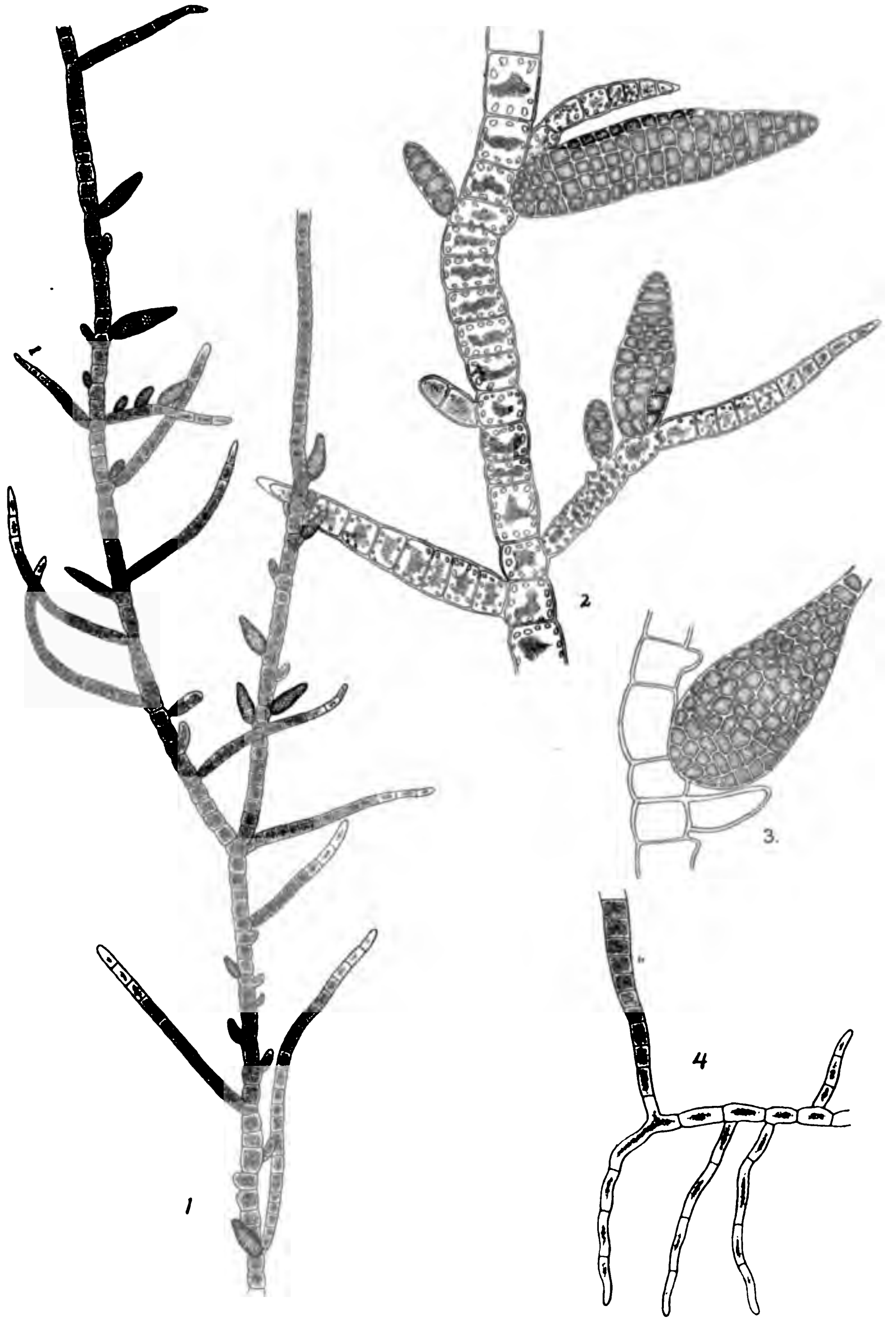
FIG. 1 – 3. [illegible]
FIG. 4 – 7. [illegible] VAR. NOV.



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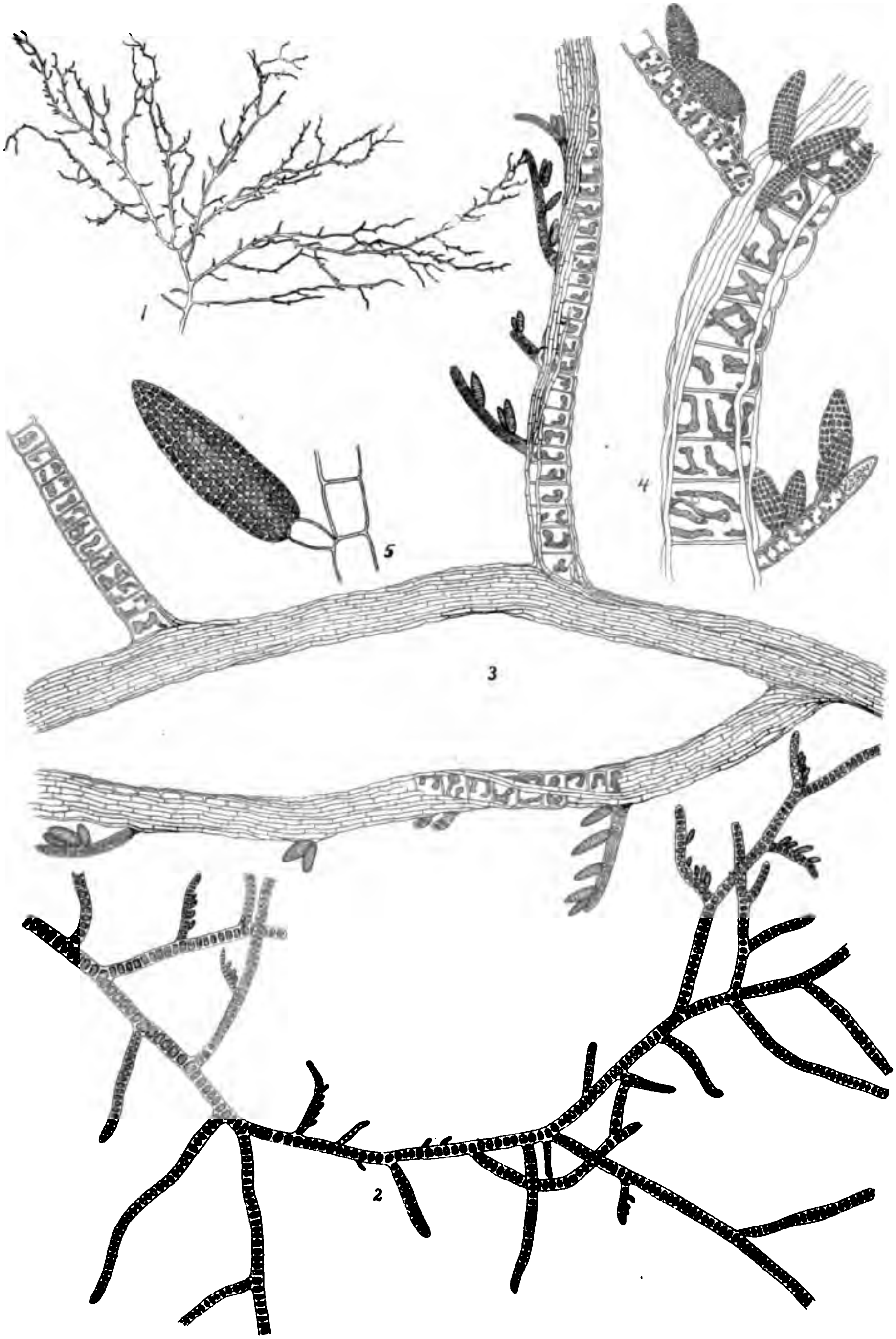
ECTOCARPUS MUCRONATUS, SP. NOV.



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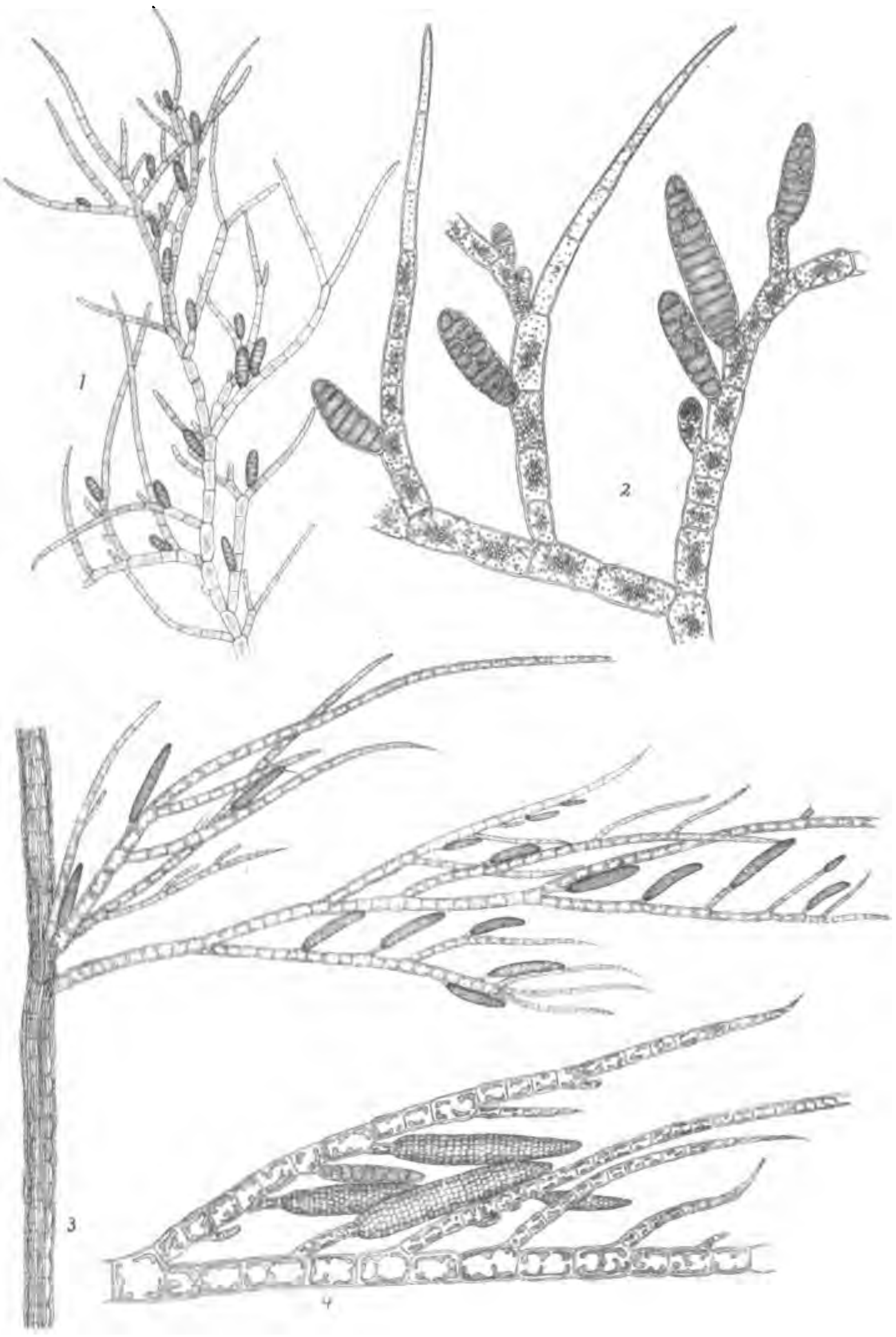
ECTOCARPUS CORTICULATUS, SP. NOV.



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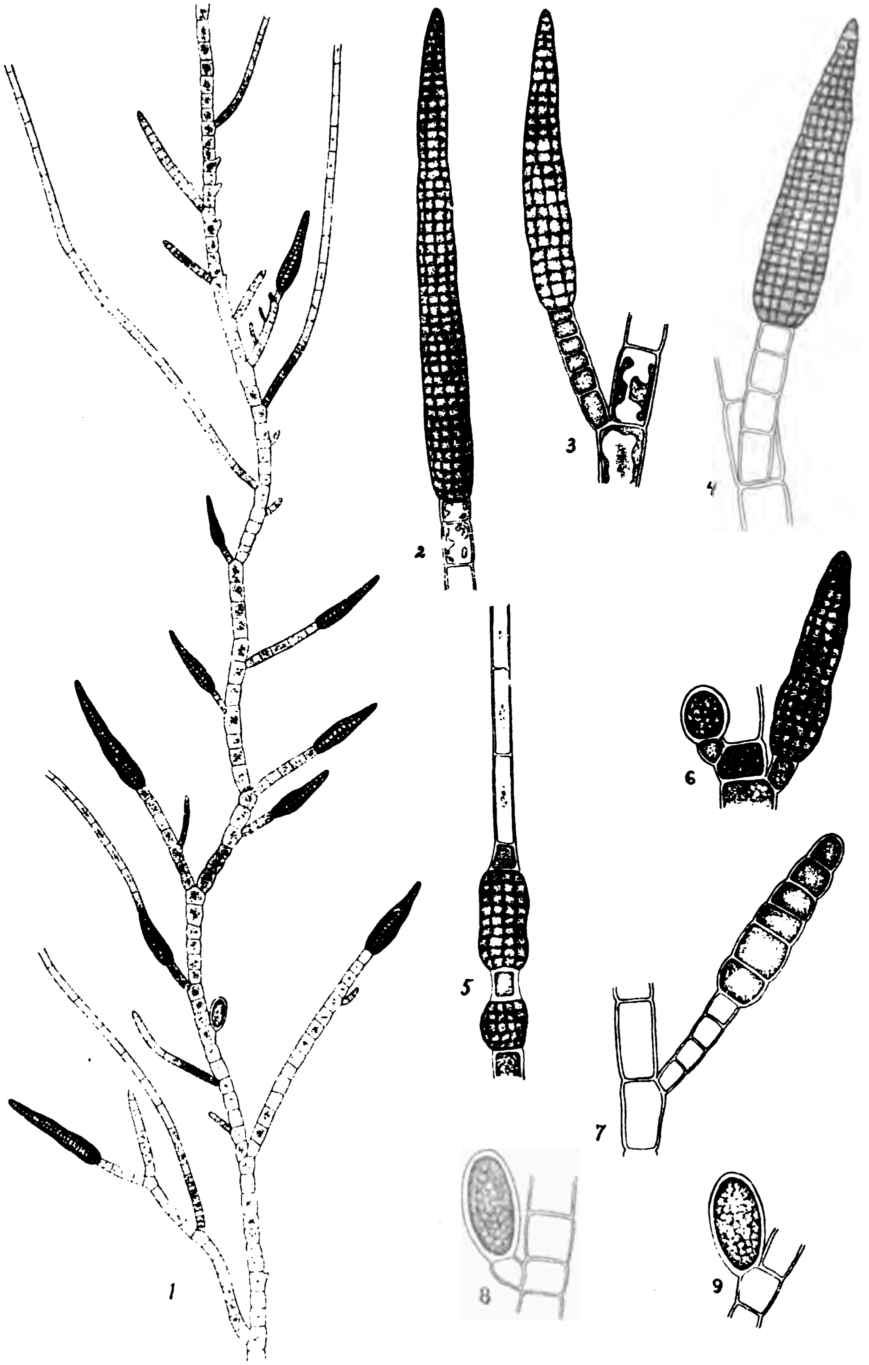
LOS ANGELES ENGR. CO.

FIGS. 1-2. ECTOCARPUS MITCHELLAE HARV.
FIGS. 3-4. [illegible] [illegible] C. AG.



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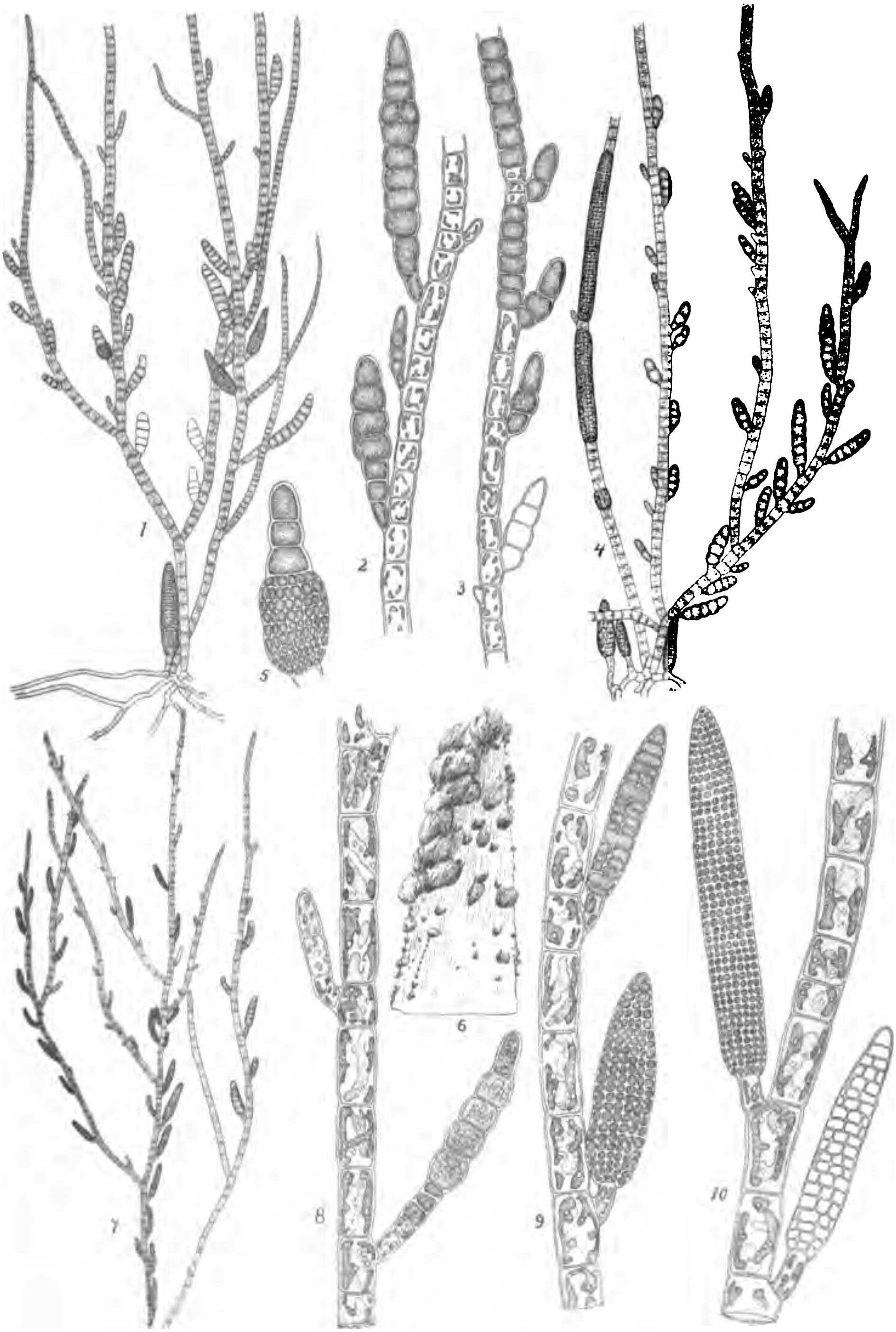
ECTOCARPUS [illegible]



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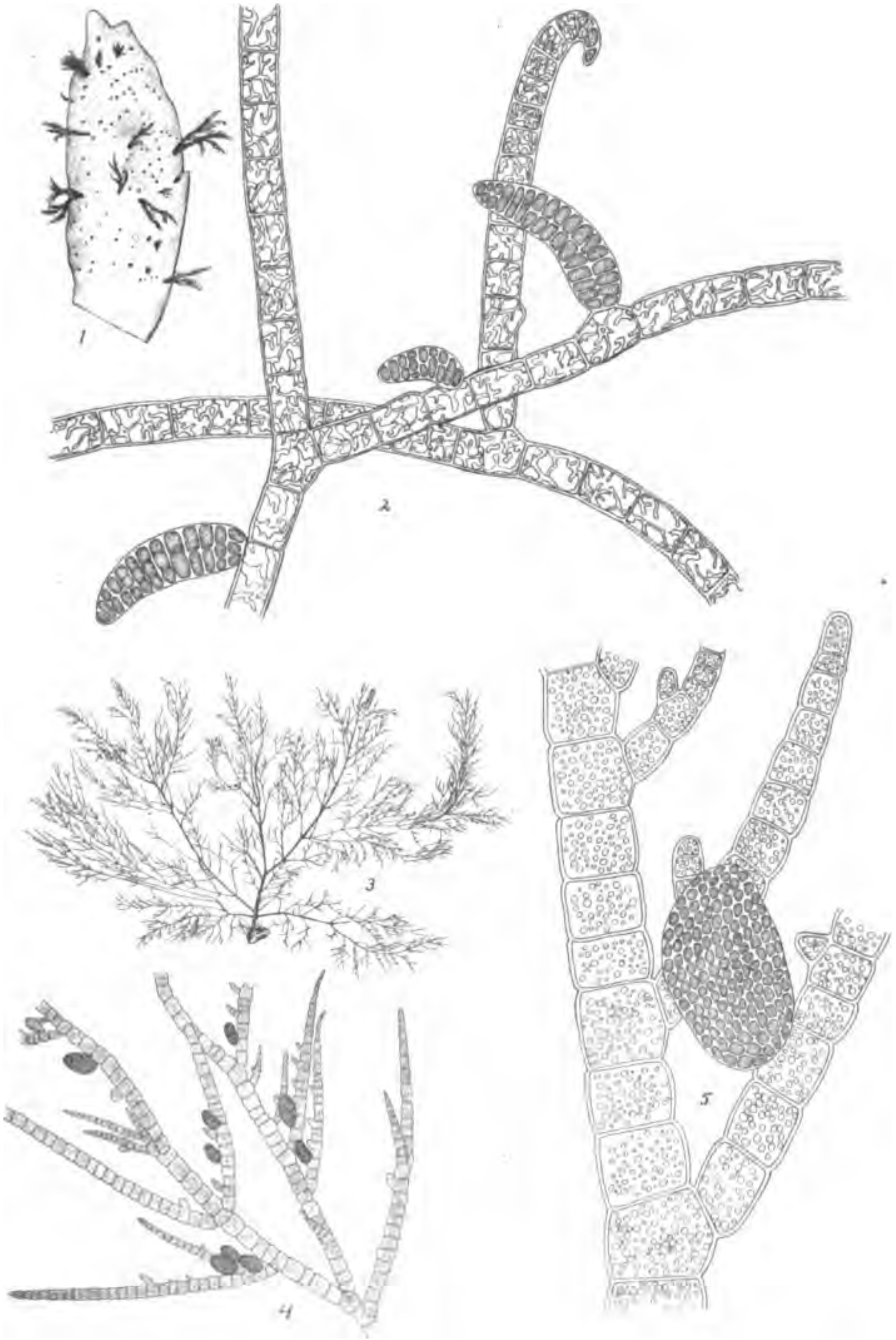
ECTOCARPUS CONFERVOIDES VARIETY [illegible]



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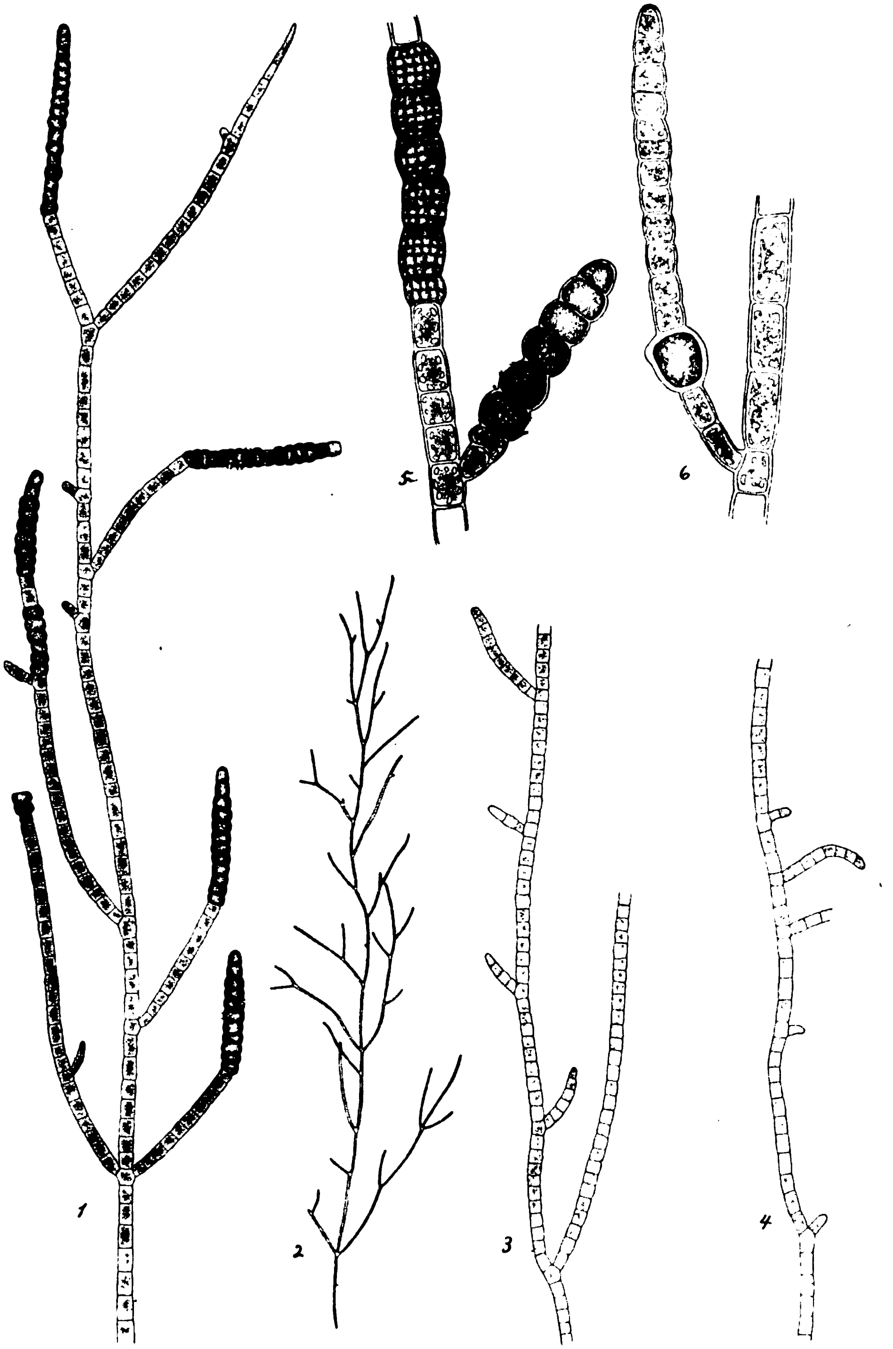
FIGS. 1 – 2. [illegible]
FIGS. 3 – [illegible]



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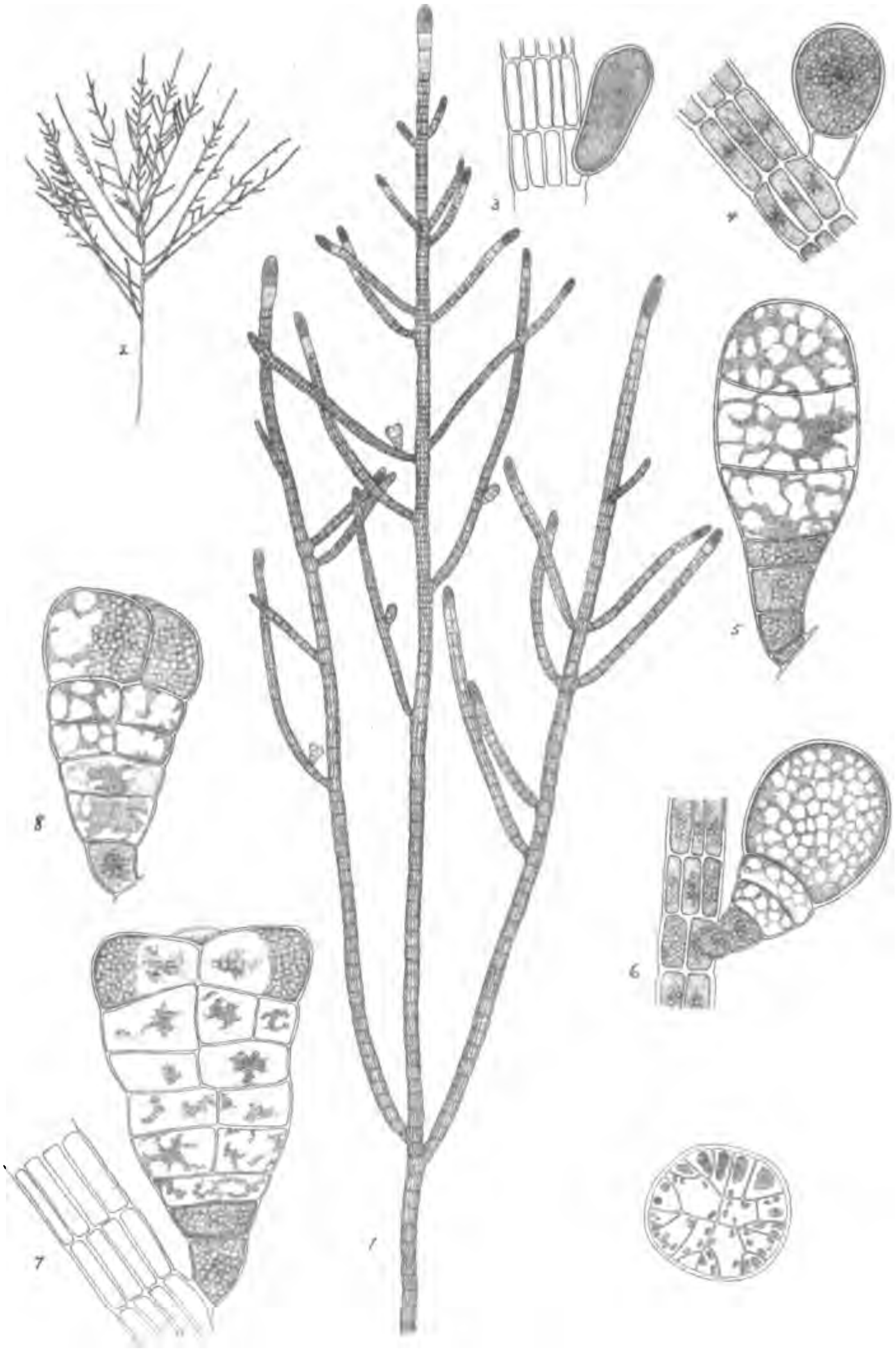
FIGS. 1-2-5-6. PYLAIELLA LITTORALIS DENSA, FORM NOV.
FIGS. 3-4. PYLAIELLA LITTORALIS, VAR.



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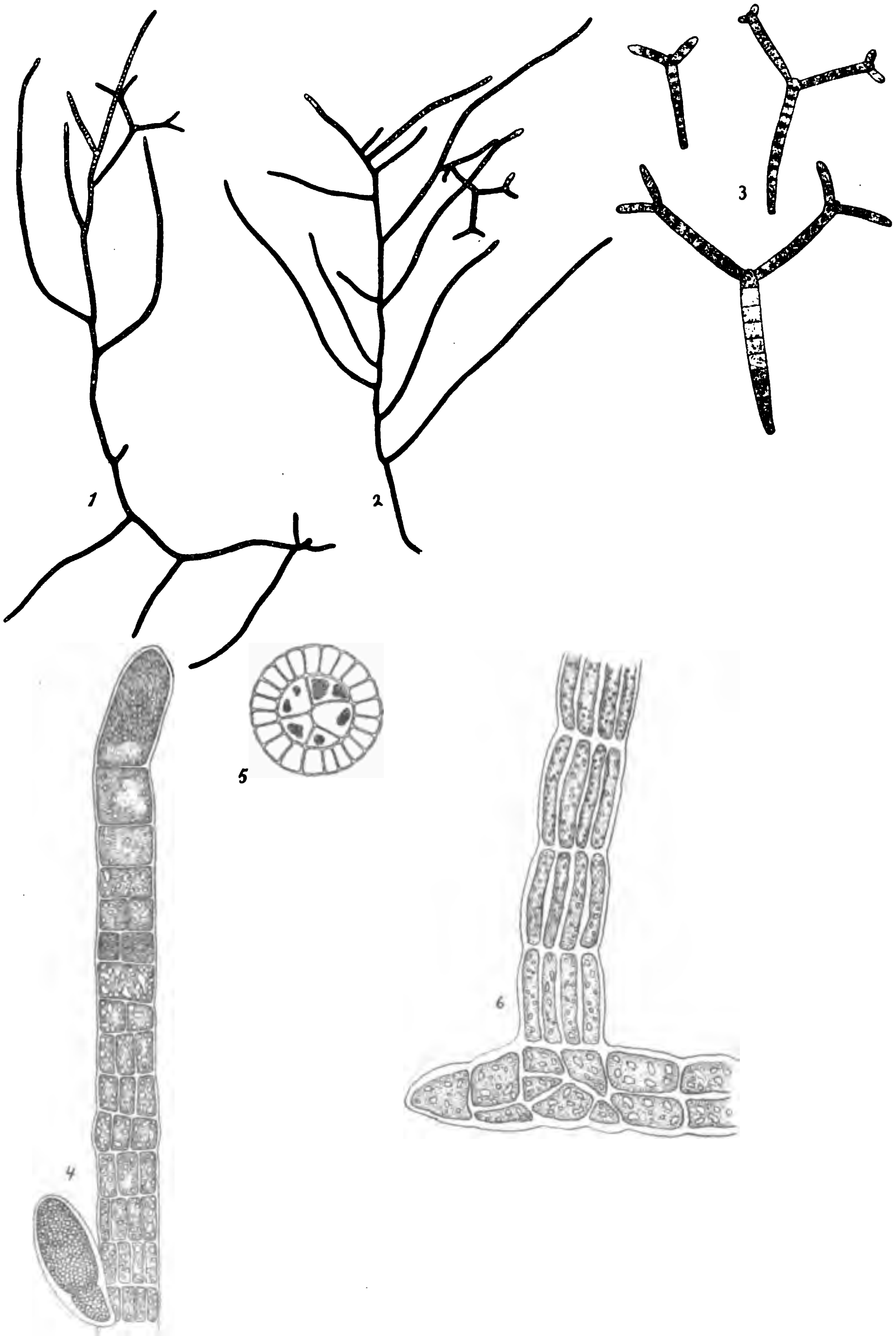
SPHACELARIA TRIBULOIDES MENEGH.

[SAUNDERS.] PLATE XXVII.



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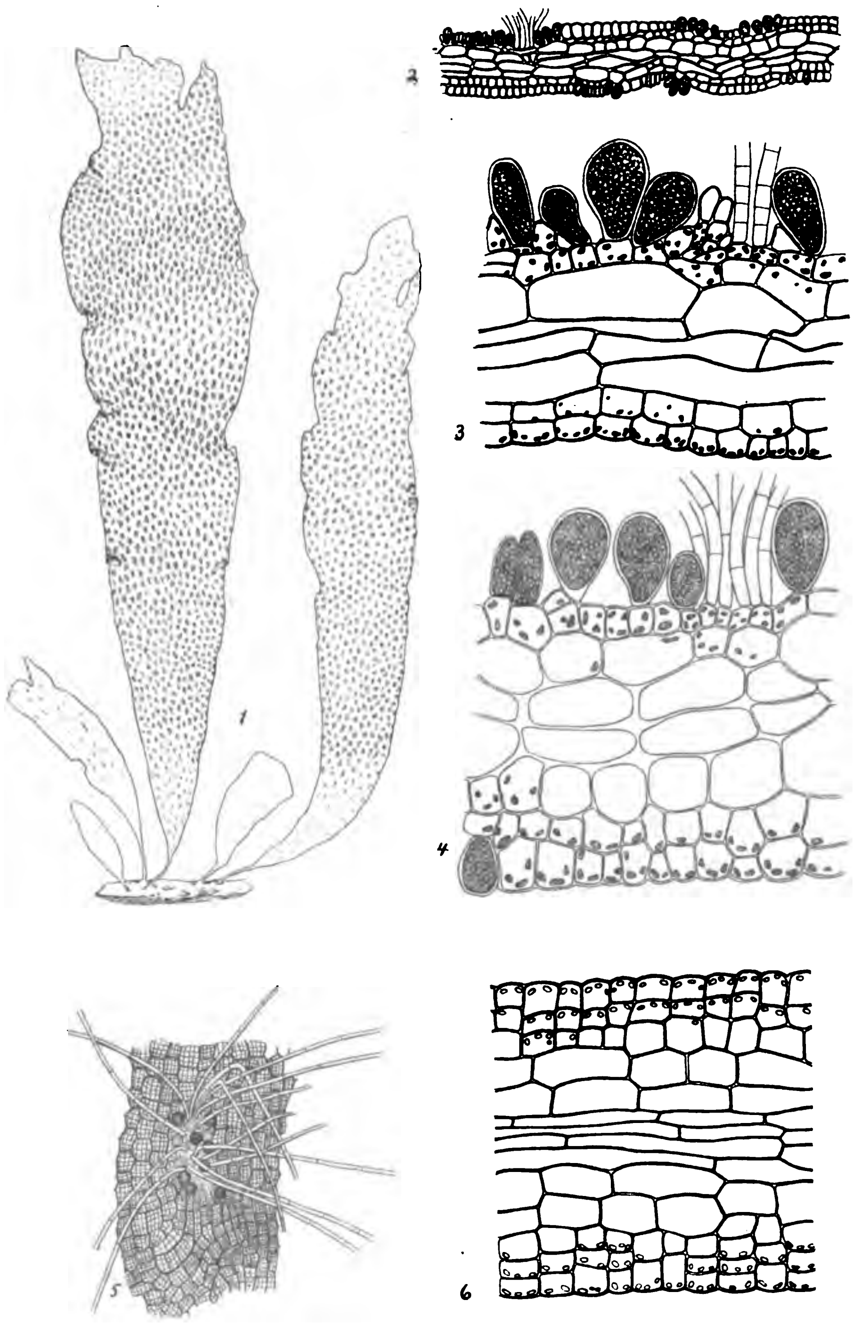
SPHACELARIA DIDICHOTOMA, SP. NOV.



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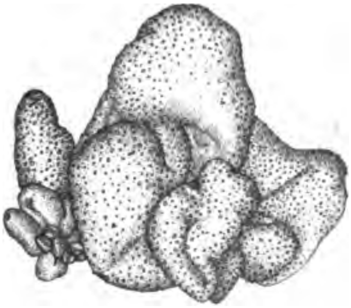
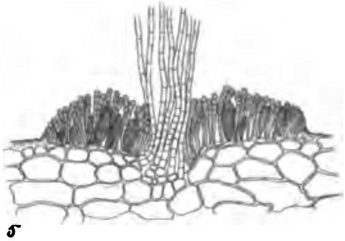
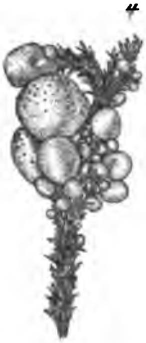
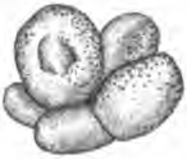
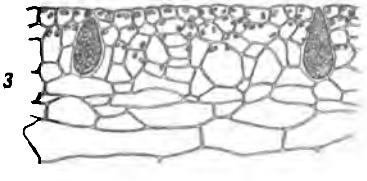
Halorhipis winstonii (Anders.) gen. nov.

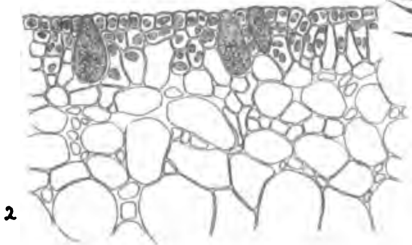


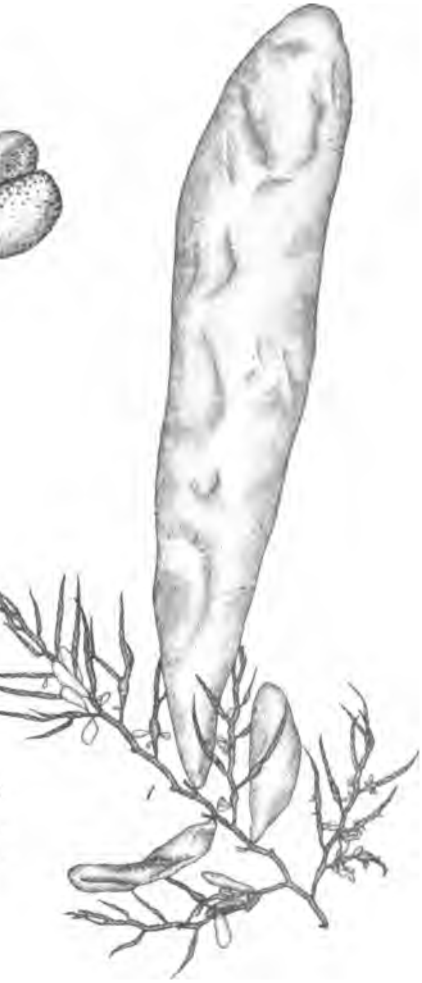






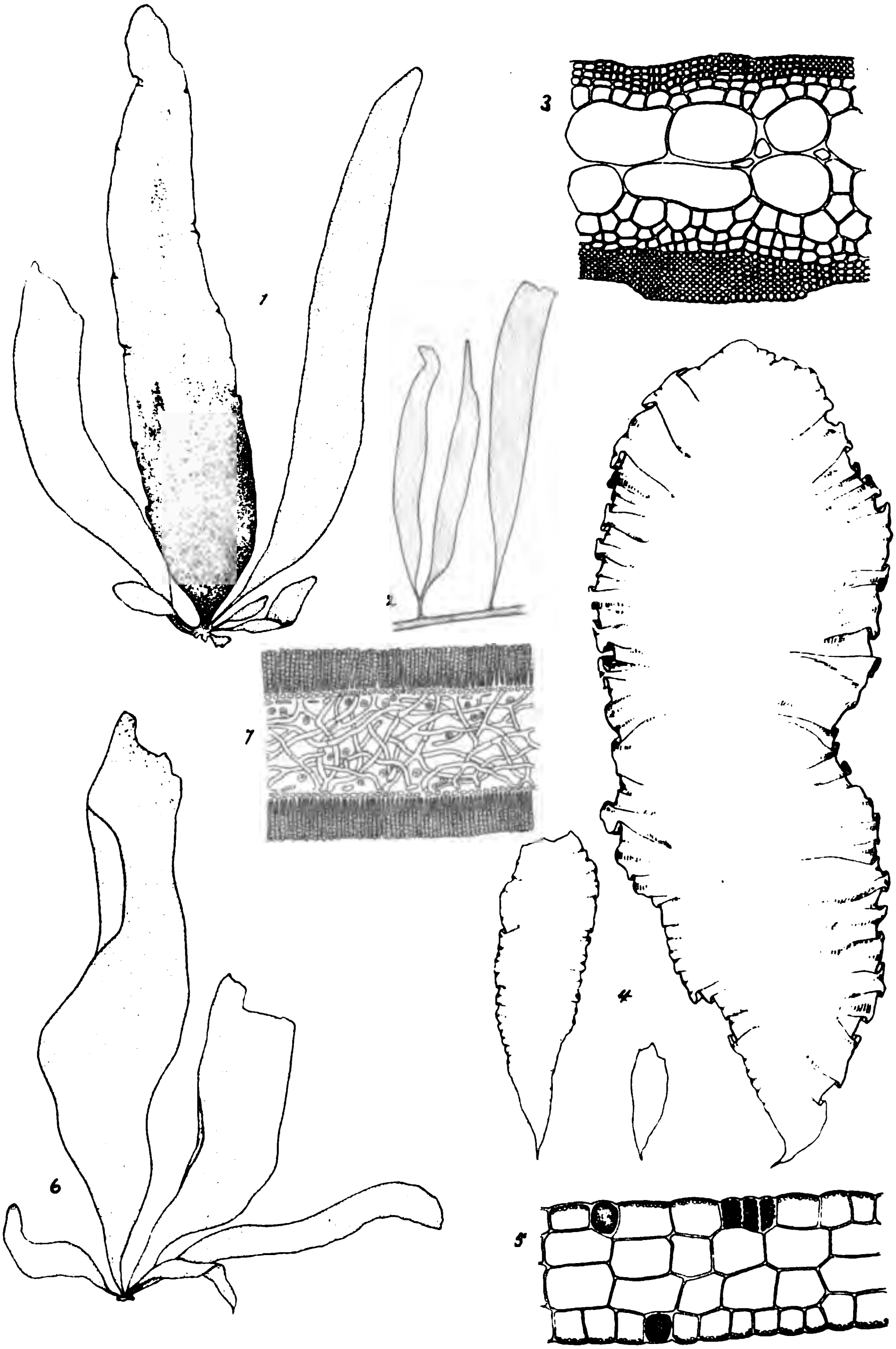






ELH DEL.   LITH. BRITTON & REY, S.F.

FIGS. 1 - 3. CHILODESME CALIFORNICA. [RUPR.] KJELLM.
FIGS. 4 - 5. SORANTHERA ULVOIDEA POST. & RUPR.



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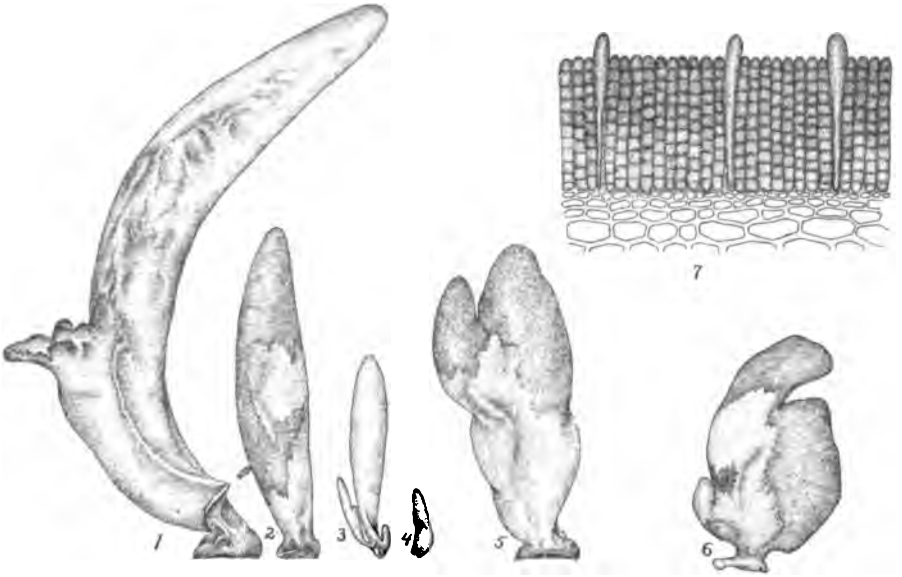
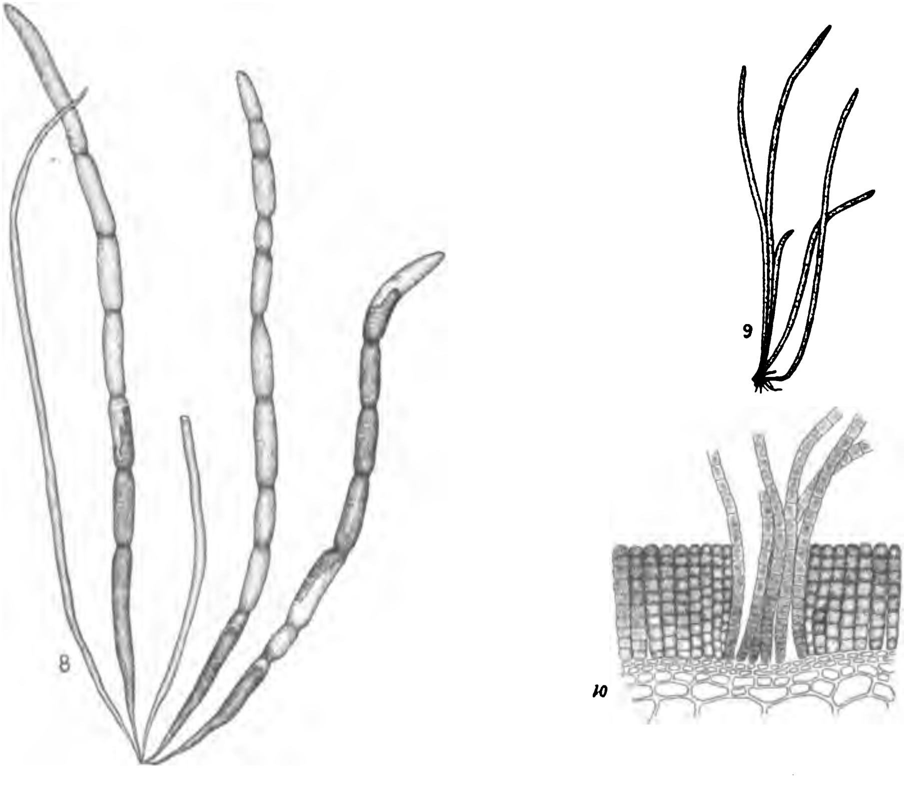
FIGS. 1 - 3 PHYLLITIS FASCIA (MUELL.) KUETZ.
FIGS. 4 - 5 HOMOEOSTROMA LATIFOLIUM J. AG.
FIGS. 6 - 7 [illegible] [illegible] (J. AG.)





[illegible] Del.

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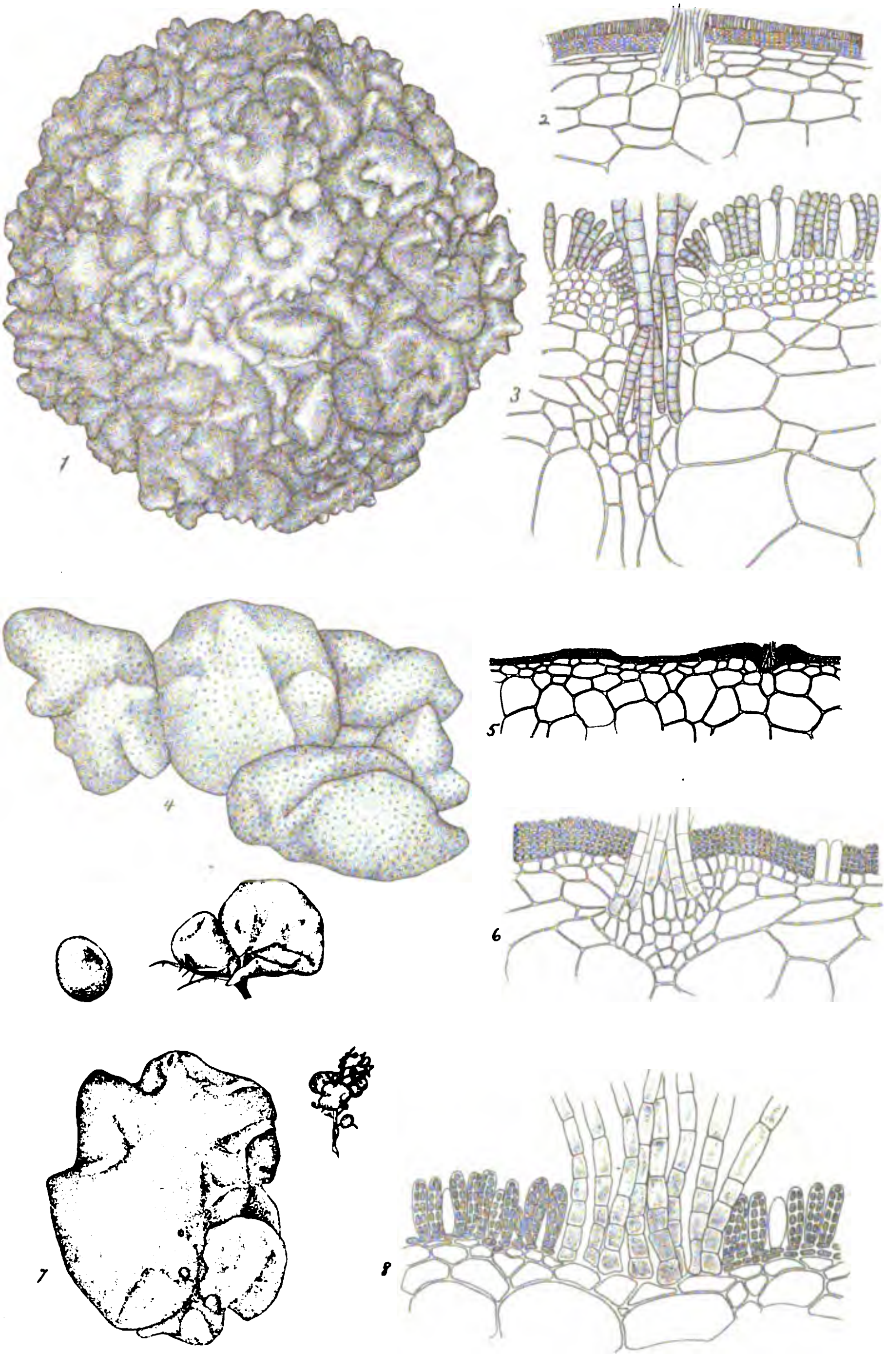
FIGS. 1 - 7. SCYTOSIPHON BULLOSUS, SP. NOV.
FIGS. 8 - 10. SCYTOSIPHON LOMENTARIUS (LYNGB.) J. AG.



E.H.H. del. Lith. Britton & Rey, S.F.

FIGS. 1 - 3. COLPOMENIA TUBERCULATA, SP. NOV.
FIGS. 4 - 6. COLPOMENIA SINUOSA EXPANSA FORM. NOV.
FIGS. 7 - 8. COLPOMENIA SINUOSA (MERT.) DERB. & SOL.

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